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ABSTRACT

Mathematics and the use of mathematical thinking should be more than what has been traditional school arithmetic. Much of the mathematical reasoning can be developed and experienced out of school, particularly in the home. This material contains recording forms and worksheets for activities for the Level Six experiences. Pupils are to complete these as part of their learning experiences. Forms and worksheets are included for all of the concepts and skills of the Level Six program. (YP)

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MEANINGFUL MATHEMATICS

LEVEL SIX

RECORDING FORMS
AND
WORKSHEETS FOR PUPIL USE

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SE 051 199

Mathematician:________________________________

"I first estimated the answer then worked the problem on the calculator."

MULTIPLICATION	ESTIMATE OF ANSWER	CALCULATOR COMPUTATION
Example: 4.15 x 6.23	25	25.8545
11.51 x 3.04		
6.03 x 4.82		
0.45 x 3.17		
0.39 0.56		
2.07 x 4.7		
9.1 x 3.43		
0.08 x 4.8		
		11789.2

Saw – Decimal multiplication

Mathematician:______________________________

"I first estimated the answer then worked the problem
on the calculator."

MULTIPLICATION	ESTIMATE OF ANSWER	CALCULATOR COMPUTATION
EXAMPLE: 0.43 1.85	<1	0.7955
3.01 x 5.92		
0.04 x 0.81		
0.15 x 8.01		
2.04 x .59		
2.031 x 1.28		
1.045 x 3.4		
2.323 x 1.56		

11789.2

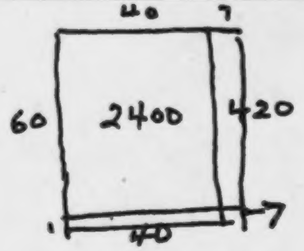
Mathematician:____

"I first decided about how big the answer would be, then did the calculation on the calculator."

Decimals	Estimates of Answer	Answer
13.41 x8.05	105	107.9505
15.062 x 3.86		
19.841 x .162	By rounding .2 x 20 = 4	3.214242
431.06 x 24.71		
43.56 x.062		
.583 x.14		
198.04 x 3.75		
.043 x .056		
15.08 x3.472		
9.04 x14		

Mathematician:______________________________

"I did these multiplications as requested."

MULTIPLICATION	EXPANDED FORM	PICTURE OF PRODUCTS
EXAMPLE: 47 x61	47 = 40+7 x61 = 60+1 2400 + 420 +40+7 2867	
74 x36		
56 x28		
72 x41		

Lesson - Multiplication with whole numbers

11789.1

Mathematician: ____________________

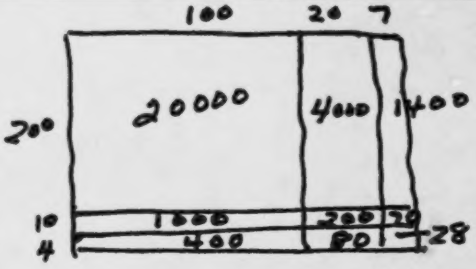
"I did these multiplications as requested."

MULTIPLICATION	EXPANDED FORM	PICTURE OF PRODUCTS
105 x23		
216 x38		
421 x30		
207 x53		

11783.1

Mathematician:____

"I did these multiplications as requested."

MULTIPLICATION	EXPANDED FORM	PICTURE OF PRODUCTS
127 x214	100+20+7 200+10+4 20000+4000+1400 1000+ 200+70 400+80+28 27,178	 100 20 7 200 20000 4000 1400 10 1000 200 20 4 400 80 28
106 x 117		
211 x145		
153 x 212		

11789.1

Mathematician: ______________________________

"I estimated the answer, then did the decimal division on the calculator."

DIVISION	ESTIMATE	CALCULATOR RESULT
EXAMPLE: 4.23 ÷ .11	41	38.4545
5.65 ÷ 1.4		
3.87 ÷ 1.01		
5.43 ÷ .08		
6.05 ÷ 1.4		
3.40 ÷ 1.7		
11.62 ÷ .15		
9.09 ÷ .11		
12.31 ÷ 1.04		
6.82 ÷ .07		

1.25.89.2

LESSON - Division of decimals

Mathematician:____

"I estimated the answer, then did the decimal division on the calculator."

DIVISION	ESTIMATE	CALCULATOR RESULT
15.02 ÷ .50		
9.÷ 1.40		
10.15 ÷ 1.01		
7.98 ÷ 2.10		
14.32 ÷ .08		
6.89 ÷ 1.41		
5.08 ÷ .08		
6.81 ÷ 1.11		
9.09 ÷ 1.1		
12.04 ÷ .06		

1.25.89.2

Mathematician:____

"I estimated the answer by rounding and found the answer using a calculator."

Decimals	Estimate of Answer	Answer
14.06 ÷ 1.82	14 ÷ 2 = 7 answer is more than this	7.725552747
182.65 ÷ 3.04		
192.06 ÷ .158		
56.43 ÷ 13.5		
91.04 ÷ .16	91 ÷ .2 = 455 answer is more than this	569.
14.56 ÷ .24		
19.64 ÷ 15.8		
106.81 ÷ 12.07		
14.34 ÷ .23		
.583 ÷ .134	big piece ÷ smaller piece gives MORE THAN ONE	
.065 ÷ .24	smaller piece ÷ by bigger piece gives much less than one	
15.46 ÷ 3.81		
.083 ÷ 4.75		

3.21.87.3

Mathematician:______________________________

"I did these multiplications as requested."

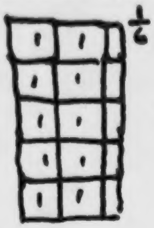
FRACTIONS TO MULTIPLY	RESULT IN LOWEST TERMS	PICTURE
$\frac{2}{3} \times \frac{5}{8}$		
$\frac{3}{5} \times \frac{3}{8}$		
$\frac{1}{2} \times \frac{2}{3}$		
$\frac{5}{6} \times \frac{7}{12}$		
$\frac{3}{4} \times \frac{11}{12}$		

12489.1

LESSON- Multiplying fractions

Mathematician:____

"I did these multiplications as requested."

FRACTIONS TO MULTIPLY	RESULT IN LOWEST TERMS	PICTURE
$1\frac{1}{3} \times \frac{2}{5}$		
$1\frac{1}{2} \times 1\frac{3}{4}$		
$2\frac{1}{6} \times 5$	$\frac{13}{6} \times 5 = \frac{65}{6} = 10\frac{5}{6}$ or $5(2) + 5(\frac{1}{6}) = 10\frac{5}{6}$	 $= 10\frac{5}{6}$
$3\frac{1}{2} \times 7$		
$1\frac{5}{8} \times 3\frac{1}{4}$		

12489.1

Mathematician:____

"I rewrote these fraction multiplications to make it easier to reduce them."

FRACTION PRODUCT	CHANGED AND REDUCED
Example: 3/5 x 1/3	1/5 x 3/3 = 1/5 x 1 = 1/5
$\frac{4}{5} \times \frac{5}{8}$	
$\frac{2}{3} \times \frac{3}{5}$	
$\frac{5}{8} \times \frac{2}{5}$	
$\frac{16}{5} \times \frac{15}{16}$	
$\frac{11}{8} \times \frac{16}{5}$	
$\frac{4}{9} \times \frac{9}{16}$	
$\frac{2}{15} \times \frac{5}{8}$	
$\frac{4}{5} \times \frac{5}{8}$	

Mathematician:______________________________ ____________________

"I rewrote these fraction multiplications to make it easier to reduce them."

FRACTION PRODUCT	CHANGED AND REDUCED
Example: 3/5 x 1/3	1/5 x 3/3 = 1/5 x 1 = 1/5
$\frac{6}{5} \times \frac{15}{8}$	$\frac{6}{8} \times \frac{15}{5} = \frac{3}{4} \times 3$
$\frac{5}{6} \times \frac{2}{15}$	
$\frac{5}{12} \times \frac{12}{15}$	
$\frac{5}{8} \times \frac{8}{5}$	
$\frac{3}{5} \times \frac{10}{3}$	
$1\frac{4}{5} \times \frac{5}{9}$	
$1\frac{3}{5} \times \frac{5}{8}$	
$1\frac{3}{5} \times \frac{7}{8}$	

Mathematician:______________________________________

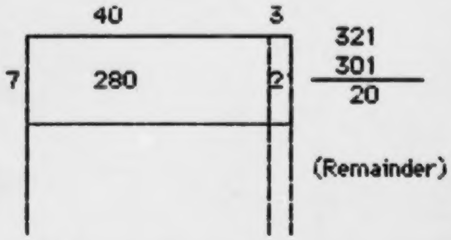
"I rewrote these fraction multiplications to make it easier to reduce them."

FRACTION PRODUCT	CHANGED AND REDUCED
Example: 3/5 x 1/3	1/5 x 3/3 = 1/5 x 1 = 1/5
$2\frac{1}{3} \times \frac{6}{7}$	
$3\frac{1}{4} \times \frac{4}{5}$	
$\frac{2}{5} \times 1\frac{2}{3}$	
$8 \times \frac{1}{8}$	
$2\frac{1}{5} \times \frac{5}{12}$	
$1\frac{7}{8} \times \frac{4}{5}$	
$4\frac{1}{2} \times \frac{2}{5}$	
$3\frac{2}{3} \times \frac{6}{15}$	

6/13/89.2

Mathematician:________________________________

"I did these divisions as indicated and showed the division with a picture."

DIVISION	IN EXPANDED FORM	PICTURE
Example: 321 + 43	7 R 20 40 + 3 ⟌ 300 + 20 + 1 280 + 20 + 1 20 REMAINDER	 40 3 7 280 21 321 301 20 (Remainder)
271 ÷ 53		
403 ÷ 29		
206 ÷ 18		
326 ÷ 51		

12489.2

LESSON- Dividing whole numbers

Mathematician: ____________________________________

"I did these divisions as indicated and showed the division with a picture."

DIVISION	IN EXPANDED FORM	PICTURE
196 ÷ 33		
275 ÷ 25		
426 ÷ 40		
329 ÷ 71		
409 ÷ 39		

12489.2

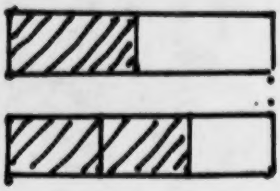
Mathematician:____

"I did these divisions as indicated and showed the division with a picture."

DIVISION	IN EXPANDED FORM	PICTURE
385 ÷ 35		
286 ÷ 34		
104 ÷ 15		
428 ÷ 62		
123 ÷ 11		

12489.2

Mathematician:______________________________________

DIVISION	PICTURE	SAME DENOMINATOR FORM	ANSWER
EXAMPLE: $\frac{1}{2} \div \frac{2}{3}$		$\frac{3}{6} \div \frac{4}{6}$	$3 \div 4 = \frac{3}{4}$
$\frac{2}{3} \div \frac{1}{2}$			
$\frac{1}{2} \div \frac{3}{8}$			
$\frac{3}{8} \div \frac{1}{2}$			
$\frac{2}{3} \div \frac{1}{4}$			
$\frac{1}{4} \div \frac{2}{3}$			
$\frac{2}{3} \div \frac{3}{4}$			

1.25.89.1

LESSON Division of fractions

Mathematician: ____________________

DIVISION	PICTURE	SAME DENOMINATOR FORM	ANSWER
$\frac{3}{4} \div \frac{2}{3}$			
$\frac{5}{6} \div \frac{1}{3}$			
$\frac{7}{8} \div \frac{1}{2}$			
$\frac{1}{2} \div \frac{3}{4}$			
$\frac{3}{4} \div \frac{7}{8}$			
$\frac{7}{8} \div \frac{3}{4}$			
$\frac{5}{8} \div \frac{3}{4}$			1.25.89.1

Mathematician: ______________________________

DIVISION	PICTURE	SAME DENOMINATOR FORM	ANSWER
$\frac{3}{4} \div \frac{5}{8}$			
$\frac{7}{8} \div \frac{1}{4}$			
$\frac{7}{12} \div \frac{1}{2}$			
$\frac{5}{12} \div \frac{1}{2}$			
$\frac{2}{3} \div \frac{5}{12}$			
$\frac{2}{3} \div \frac{7}{12}$			
$\frac{11}{12} \div \frac{1}{2}$			

1.25.89.1

Mathematician: ____

"For each pair of fractions given, I decided which was larger, joined them, found the difference between and divided one by the other both ways."

FRACTIONS	SAME DENOMINATORS	COMPARED	JOINED	THE DIFFERENCE BETWEEN	DIVIDED
Example: $1\frac{2}{3}, 1\frac{3}{4}$	$1\frac{8}{12} = \frac{20}{12}$ $1\frac{9}{12} = \frac{21}{12}$	$\frac{21}{12} > \frac{20}{12}$ so $1\frac{3}{4} > 1\frac{2}{3}$	$\frac{20}{12} + \frac{21}{12} =$ $\frac{41}{12} = 3\frac{5}{12}$	$\frac{21}{12} - \frac{20}{12} =$ $\frac{1}{12}$, so $1\frac{3}{4} - 1\frac{2}{3} =$ $\frac{1}{12}$	$1\frac{2}{3} \div 1\frac{3}{4}$ $\frac{20}{12} \div \frac{21}{12} = \frac{20}{21}$ $1\frac{3}{4} \div 1\frac{2}{3}$ $\frac{21}{12} \div \frac{20}{12} = \frac{21}{20}$
$\frac{5}{8}$ $\frac{2}{3}$					
$\frac{3}{5}$ $\frac{5}{6}$					
$\frac{3}{4}$ $\frac{5}{6}$					
$\frac{2}{3}$ $1\frac{1}{3}$					

Reviewing fractions

Mathematician:____

"For each pair of fractions given, I decided which was larger, joined them, found the difference between and divided one by the other both ways."

FRACTIONS	SAME DENOMINATORS	COMPARED	JOINED	THE DIFFERENCE BETWEEN	DIVIDED
$1\frac{3}{8}$ $1\frac{2}{3}$					
$2\frac{1}{8}$ $1\frac{3}{4}$					
$1\frac{3}{8}$ $\frac{7}{8}$					
$1\frac{1}{3}$ $\frac{3}{4}$					
$1\frac{2}{3}$ $\frac{4}{5}$					

Mathematician:____

"I changed these numbers into SCIENTIFIC NOTATION (written with powers of ten)

NUMBER	IN SCIENTIFIC NOTATION	NUMBER	IN SCIENTIFIC NOTATION
Example: 143.8	1.438×10^{2}	.0012	
.041	4.1×10^{-2}	3.81	
12.44		9.05	
16.05		1,413	
1421.0		.0002	
.3141		15.41	
.0042		108.0	
158.1		904.5	
19.02		.0421	

Mathematician:________________________________

"I multiplied and divided these numbers by adding exponents to multiply and subtracting exponents to divide."

NUMBERS	PRODUCT OR QUOTIENT
Example: 14.1 × .48 ↓ add exponents of 10's	$1.41 \times 10 \times 4.8 \times 10^{-1}$ = $1.41 \times 4.8 \times 10^{(1+-1)}$ = $1.41 \times 4.8 \times 10^{0}$ = 1.41×4.8 = 6.768
201.1 ÷ .02 ↓ subtract exponents of 10's	$2.011 \times 10^{2} \times 2 \times 10^{-2}$ = $2.011 \times 2 \times 10^{(2--2)}$ = $2.011 \times 2 \times 10^{4}$ = 4.022×10^{4} = 40220.
304.1 × 21.6	
304.1 ÷ 21.6	
15.4 × .004	
15.4 ÷ .004	

Mathematician: ____________________

"I multiplied and divided these numbers by adding exponents to multiply and subtracting exponents to divide."

NUMBERS	PRODUCT OR QUOTIENT
343 ÷ 21.7	
486.7 × .004	
523.1 ÷ 3.05	
.045 × .043	
.045 ÷ .043	
6.321 × .05	

Mathematician:____

"I changed these numbers to SCIENTIFIC NOTATION and multiplied or divided by adding or subtracting exponents of ten."

NUMBERS	IN SCIENTIFIC NOTATION	RESULT
304.0 × 201		
304 ÷ 2.01		
.005 × .013		
.005 ÷ .013		
14.5 × 30.2		
145.0 ÷ 30.2		

Mathematician:____

"I estimated the answer by rounding and found the answer using a calculator."

452 × 134		
398 × 17		
436 ÷ 21		
383 × 141		
693 ÷ 35		
143 × 387		
126 × 17		
19 × 302		
21 × 5871		
18 × 4120		
280 × 19		
280 ÷ 19		
5871 ÷ 21		

3.21.89.3

Mathematician:

"I estimated the answer by rounding and found the answer using a calculator."

421 ÷ 13		
621.7 ÷ .52		
384.1 × 2.8		
981 ÷ .03		
14.27 ÷ 3.1		
625 ÷ 18		
2831 ÷ 14		
98.7 × 3.3		
42.1 × .06		
973.1 ÷ .06		
99.2 ÷ 81		
1492 ÷ 12		
386 ÷ .09		

3.21.89.3

Mathematician:________________________________

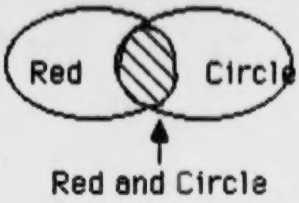
"For each UNIVERSE given, I wrote the missing term."

UNIVERSE	IS	NOT
Cars	Ford	
Buildings		Not house
Trees	Birch	
Sports		Not baseball
Colors	Red	
Shapes		Not triangle
Subjects	Science	
Patterns		Not flowered
Shells	Smooth	
Pets		Not cat

3.13.89.1

Mathematician:____

"I drew a diagram to show each description."

COMPOUND PHRASE	DIAGRAM
Sample: RED AND CIRCLE	 Red Circle Red and Circle
MEN AND TEACHERS	
WOMEN AND TEACHERS	
STRONG AND BRAVE	
HIGH AND MIGHTY	

Mathematician:________________________________

"I drew a diagram to show each description."

COMPOUND PHRASE	DIAGRAM
WHITE AND FLUFFY	
RICH AND FAMOUS	
DOWN AND DIRTY	
ALIVE AND WELL	

Mathematician:____

"I drew diagrams to show whether INCLUSIVE or EXCLUSIVE OR is shown."

OR PHRASE	DIAGRAM
BOY OR GIRL	
MAN OR FIREMAN	
HERE OR THERE	
SICK OR PRESENT	
RED OR SOFT	

Mathematician:______________________________________

"I drew diagrams to show whether INCLUSIVE or EXCLUSIVE OR is shown."

OR PHRASE	DIAGRAM
UP OR DOWN	
BLONDE OR BLUE EYED	
WOMAN OR TEACHER	
MAN OR COOK	
ROBIN OR BIRD	

7.18.89.3

Mathematician:____________________________________

"I changed one word to make the given true statements false."

TRUE STATEMENT	FALSE STATEMENT
EXAMPLE: If red, then square	If red, then triangle
If rich, then famous	
If famous, then rich	
If work, then get paid	
If get paid, then worked	

7.18.89.4

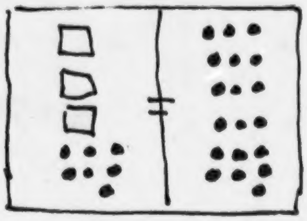
Mathematician:______________________________

"I changed one word to make the given true statements false."

TRUE STATEMENT	FALSE STATEMENT
If rich, then popular	
If popular, then rich	
If poor, then sick	
If alone, then cry	
If alive, then think	
If high, then mighty	
If down, then out	

Mathematician:____

"I found what gives in the ☐ in each case, doing one step at a time."

OPEN SENTENCE	PICTURE	STEPS TO FIND ☐
$3\square + 7 = 19$		$3\square + 7 = 19$ $3\square = 12$ $\square = 4$
$12 = 4 + 2\square$		
$17 = 2 + 3\square$		
$4\square + 1 = 25$		

Solving open Sentences

2.2.2.54.3

Mathematician:____

"I found what gives in the ☐ in each case, doing one step at a time."

OPEN SENTENCE	PICTURE	STEPS TO FIND ☐
$3\square + 9 = 27$		
$2\square - 4 = 8$		
$9 = 3\square - 9$		
$2\square - 5 = 7$		

Mathematician:____

"I found what gives in the □ in each case, doing one step at a time."

OPEN SENTENCE	PICTURE	STEPS TO FIND □
$34 = 4 + 3\square$		
$5\square + 3 = 18$		
$4\square + 1 = 13 + \square$		
$3\square + 7 = \square + 15$		

Mathematician:____

"I added, and subtracted numbers or multiplied or divided by numbers to find ONE □ ."

OPEN SENTENCE	WHAT I DID TO BOTH SIDES	NUMBER IN □
$7 - \square = 3$		
$12 = 15 - \square$		
$2\square = 9$		
$5 = \frac{1}{3}\square$		
$3\square = 14$		
$2\square = 15$		

Mathematician:____

"I added, and subtracted numbers or multiplied or divided by numbers to find ONE □."

OPEN SENTENCE	WHAT I DID TO BOTH SIDES	NUMBER IN □
$\frac{1}{3}\square = 3$		
$3\square = 18$		
$15 = 5\square$		
$18 = 6\square$		
$4 = \square + 1$		
$8 = \square - 3$		

Mathematician:____

"I added, and subtracted numbers or multiplied or divided by numbers to find ONE □ ."

OPEN SENTENCE	WHAT I DID TO BOTH SIDES	NUMBER IN □
$2\square = 16$	$\div 2$	$\square = 8$
$3\square = 27$		
$\square + 3 = 7$		
$\square - 4 = 6$		
$\frac{1}{2}\square = 4$		
$\square + 3 = 10$		

Mathematician:____

"For each problem involving distance and time, I made a table and found the missing amount from the table or from a proportion."

<table>
<tr><th>PROBLEM</th><th>TABLE</th><th>PROPORTION</th></tr>
<tr>
<td>Example:
A train travels 210 miles in 3 hours. How far can it travel in 5 hours?</td>
<td>
<table>
<tr><td>Miles</td><td>70</td><td>140</td><td>210</td><td>280</td></tr>
<tr><td>Hours</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
</table>
<table>
<tr><td>Miles</td><td>350</td><td>420</td><td>490</td></tr>
<tr><td>Hours</td><td>5</td><td>6</td><td>7</td></tr>
</table>
</td>
<td>$\frac{210 \text{ mi.}}{\square \text{ mi.}} = \frac{3 \text{ hr.}}{5 \text{ hr.}}$
$3\square = 5 \times 210$
$\square = \frac{5 \times 210}{3} = 350 \text{ mi.}$</td>
</tr>
<tr><td>John walks 7 miles in one hour. How far could he walk in 2 1/2 hours?</td><td></td><td></td></tr>
<tr><td>Joan can run 100 meters in 12 seconds. Assuming she can hold that speed for 300 meters, how long should a run of 300 meters take?</td><td></td><td></td></tr>
<tr><td>A car travels 300 miles in 6 hours. How far had it travelled after 4 hours?</td><td></td><td></td></tr>
</table>

2.27.89.2

Mathematician:____

"For each problem involving distance and time, I made a table and found the missing amount from the table or from a proportion."

PROBLEM	TABLE	PROPORTION
Two trains start from a station at the same time. After one hour, one has gone 50 miles and the other 60 miles. How far apart will they be after 3 hours?		
The faster of two cars travels 400 miles while the other travels 300 miles. When the slower has gone 600 miles, how far will the faster have gone?		
If Diane runs 4 miles for each 3 miles run by Vivian, how far will Vivian have run when Diane has run 12 miles?		
Minnows swim twice as fast as crayfish. Crayfish swim three times as fast as leeches. Minnows swim how many times as fast as leeches?		

2.22.89.2a

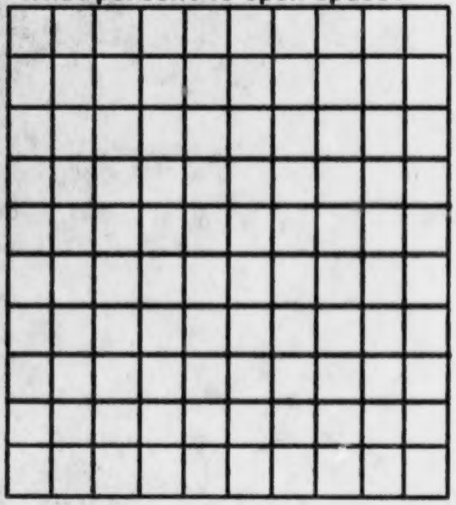
Mathematician:______________________________________

"I worked the following problems using percents."

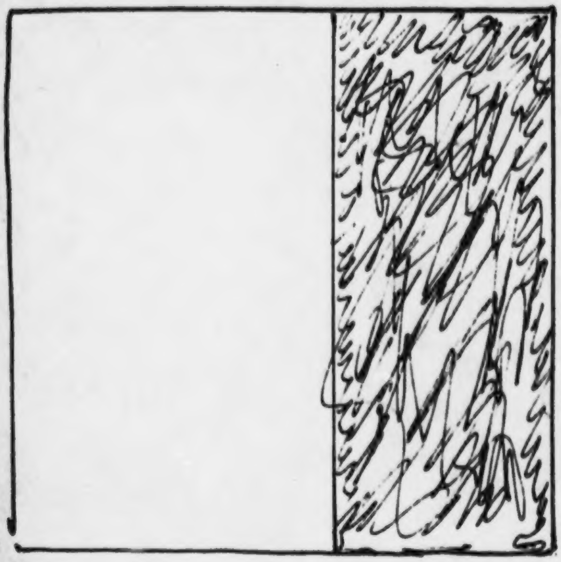
PERCENTS: The hundred grid represents a whole basement. Show a good way to divide it up so that:

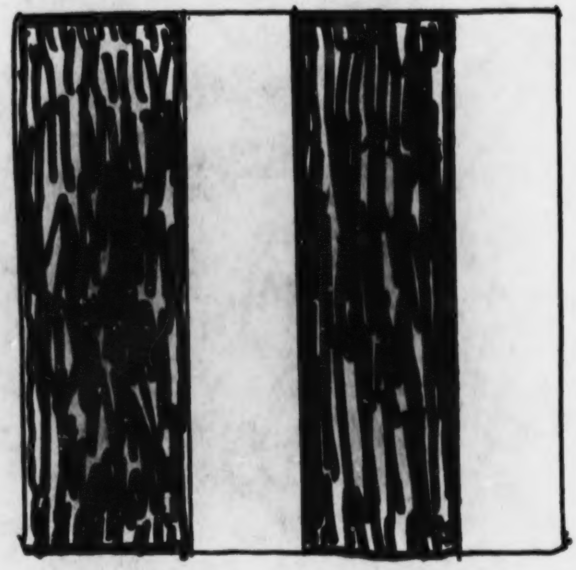
20% is a workshop
15% is a laundry area
15% is sauna
The rest is open space

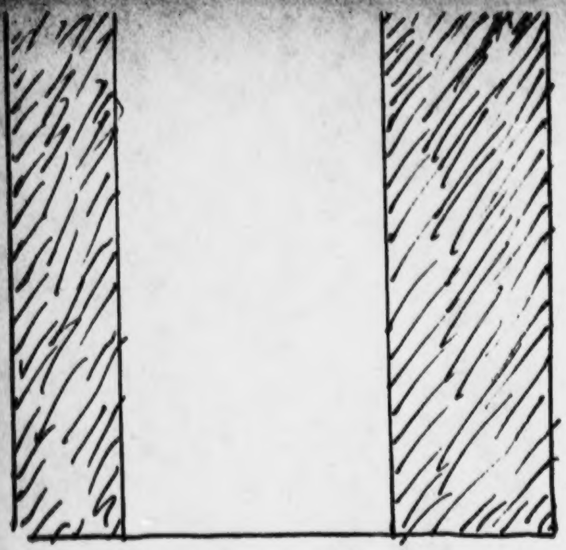
"What percent is open space?"



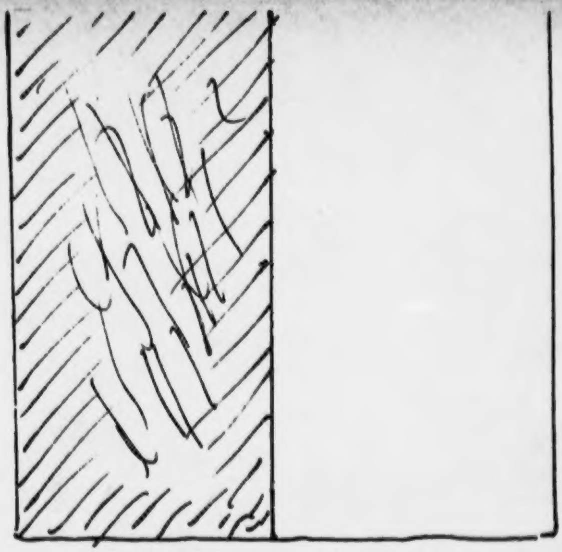
Estimate the percent of each given square that is figured or shaded. The use a HUNDRED grid the same size as the square to find the percent.



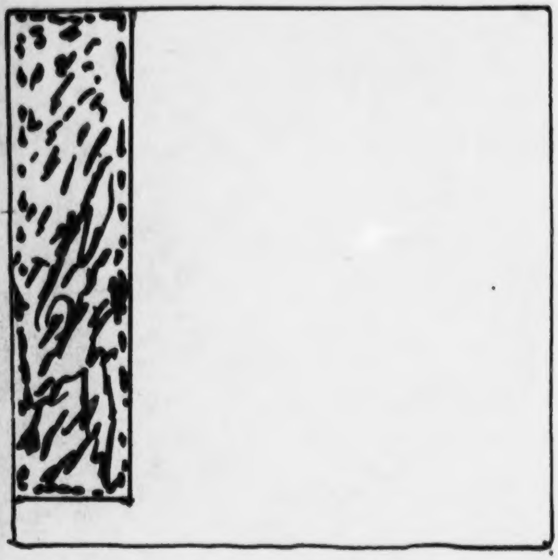




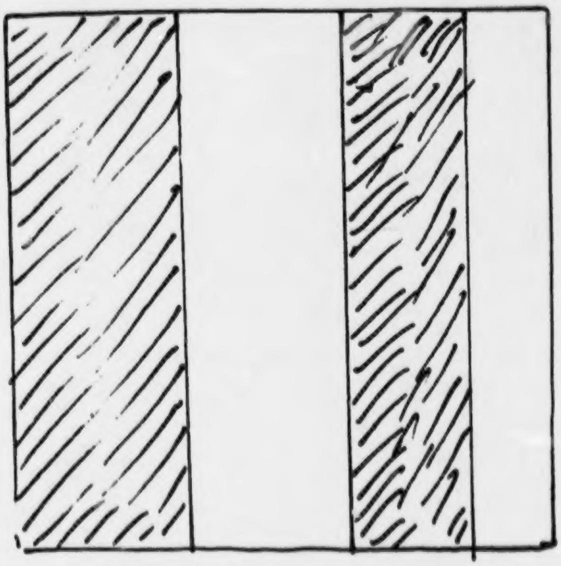
Estimate ____ Answer ____



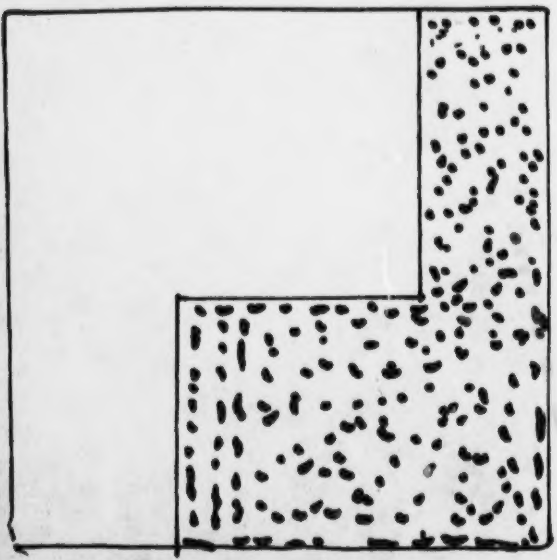
Estimate ____ Answer ____



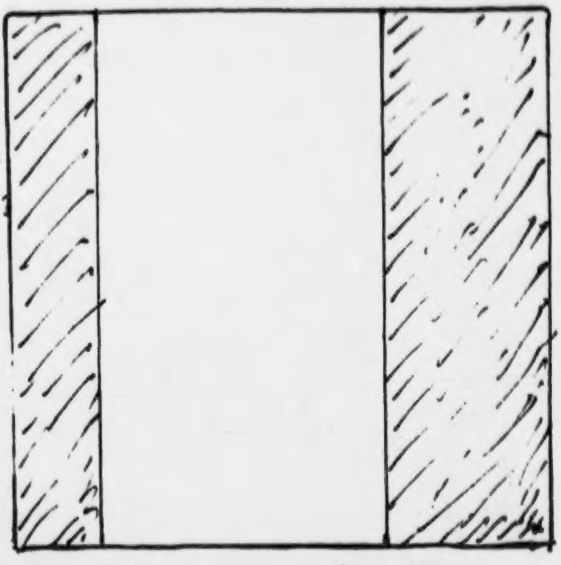
Estimate ____ Answer ____



Estimate ____ Answer ____

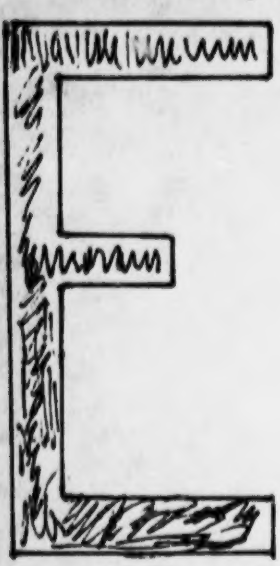


Estimate ____ Answer ____

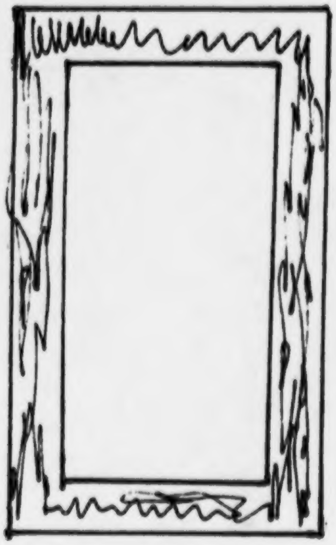


Estimate ____ Answer ____

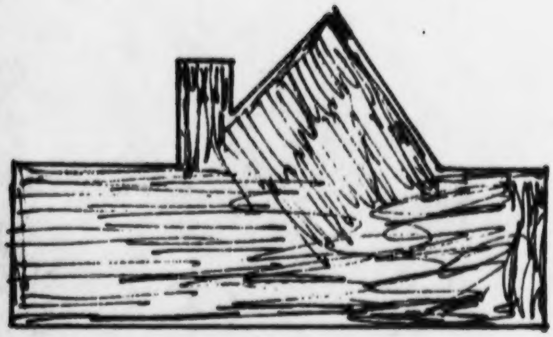
Estimate the percent of a 100 grid shown by each colored figure given. Then use a transparent 100 grid to find the answer.



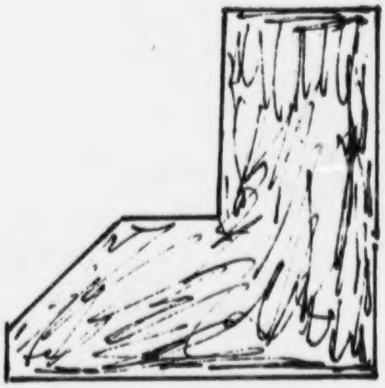
Estimate ______
Answer ______



Estimate ______
Answer ______

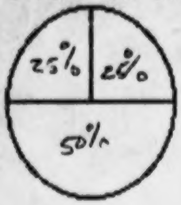


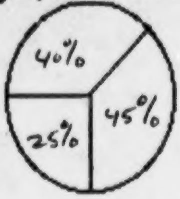
Estimate ______
Answer ______

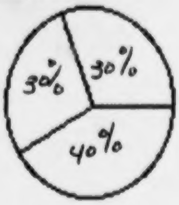


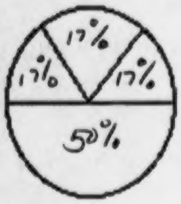
Estimate ______
Answer ______

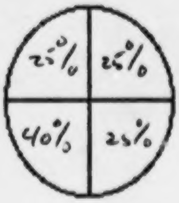
Circle the circle graphs that are reasonable:

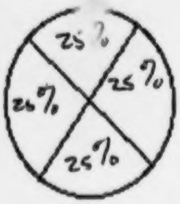






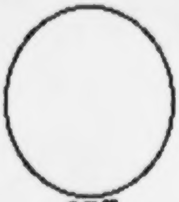




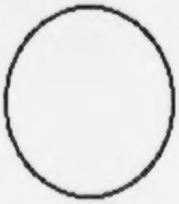


Draw lines in to divide each circle according to percents given:

60%,20%,20%



25%
25%
50%



50%
25%
15%
10%

For each problem, make a table if that helps to see the proportion how the answer is found.

Problem	Solution
If Frank pays back the $900 he borrowed in a month, 12% interest will be charged. How much interest does he pay?	
Bill made a 10% cash down payment on a stereo set that cost $289. How much did he pay as a down payment?	
Tess's father leaves a 15% tip for waitresses. The check when the family ate out at The Eatery was $50. How much tip did Tess's father leave?	
During December, Joyce made 28 of 32 free throws. What percent did she make?	
At the end of the day, Bob said the painting job was 95% complete. What percent was left to do?	
Minnesota had a 7% sales tax. How much should be paid in sales tax on a $14,500 car?	
When Bob filled 28 boxes, his employer told him his job was 80% completed. How many boxes did Bob have to fill to start with?	
What percent of the students are girls in a school where there are 62 girls and 78 boys?	
Tom went to borrow $100 at the bank. He said he would pay it back after a year. The bank gave him $96. What rate of "discount interest" did the bank charge Tom?	

Mathematician:____

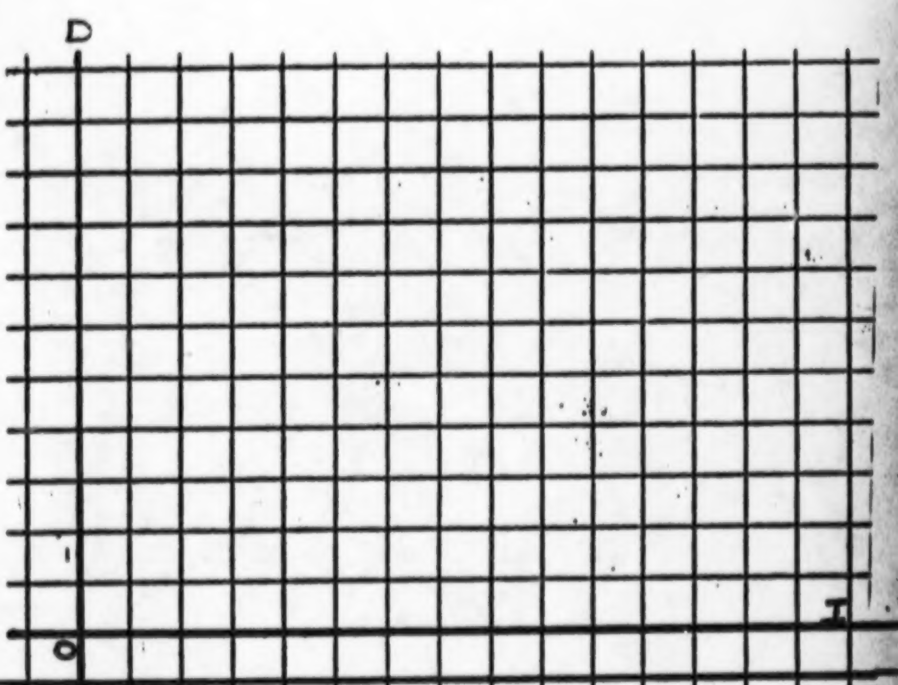
"I completed each table of values for D and I, found the constant change in D and the rule and graphed this."

TABLE

GRAPH

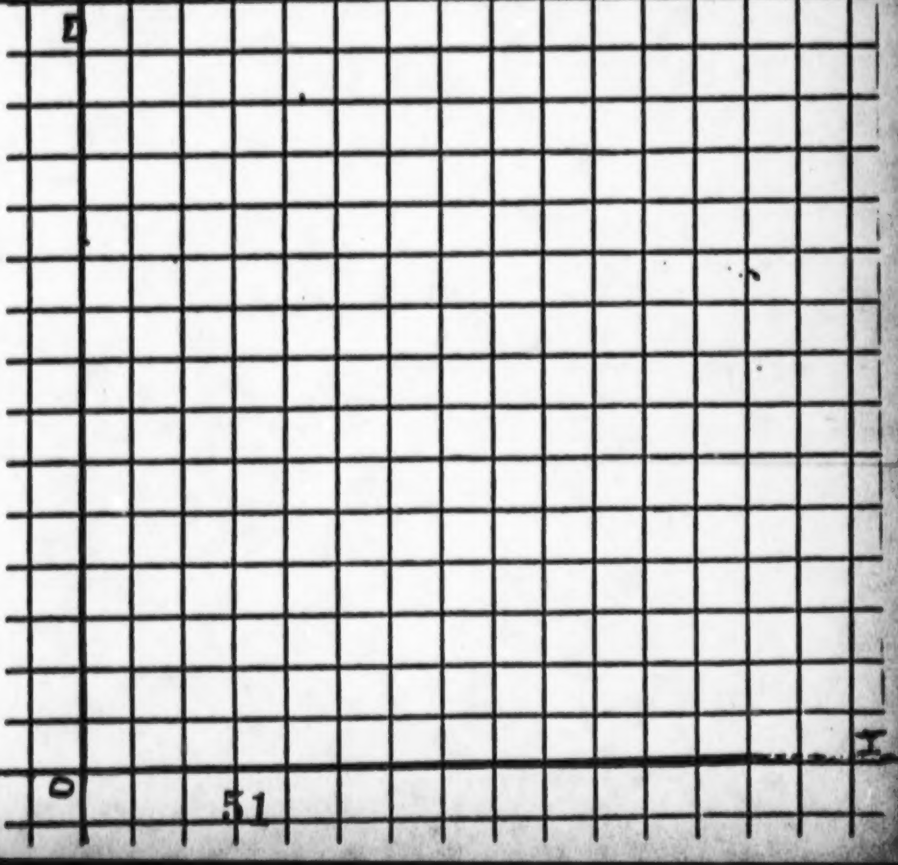
I	D	Change in D
		2
1	2	
		2
2	4	
		2
		2
		2
		2

Rule:



I	D	Change in D
0	5	
		1
		1
		1
		1
		1
		1

Rule:



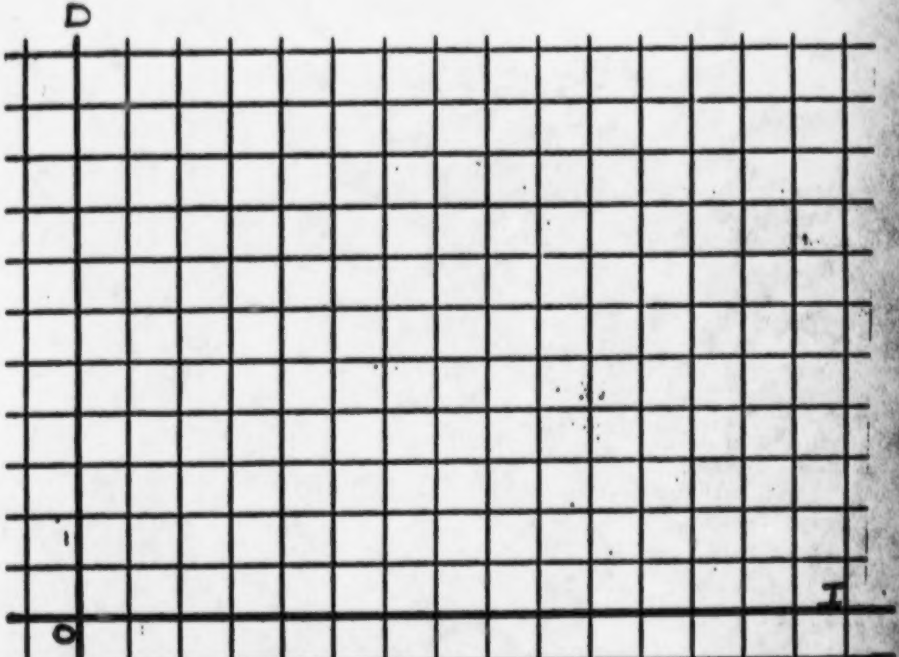
Mathematician:____

"I completed each table of values for D and I, found the constant change in D and the rule and graphed this."

TABLE

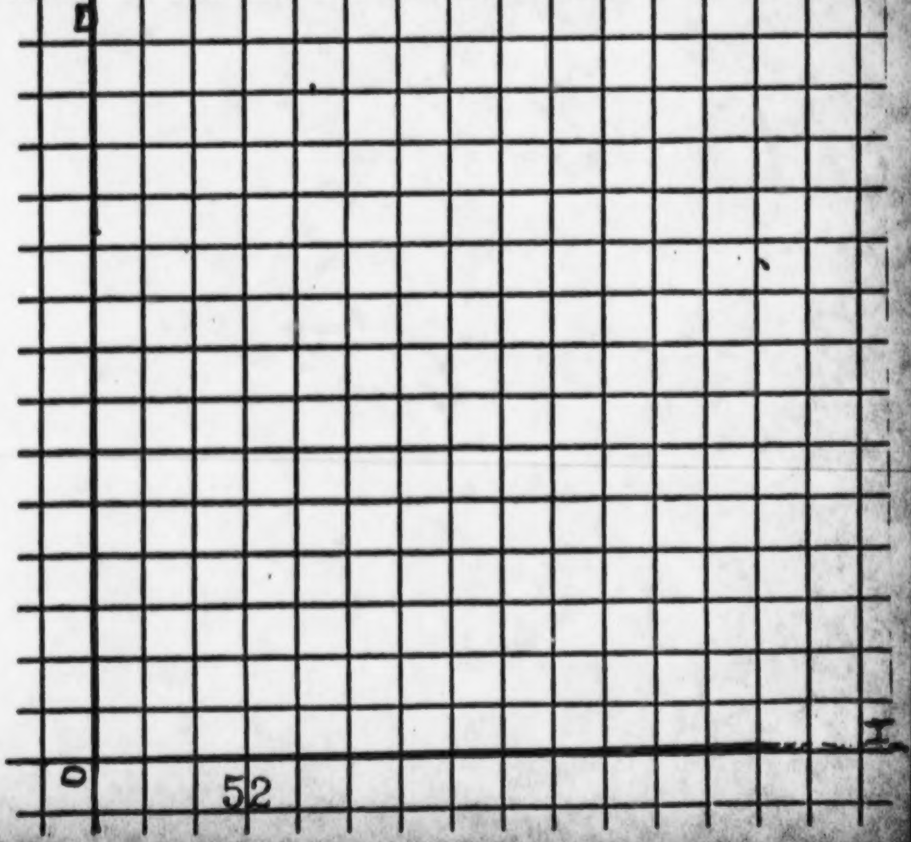
I	D	Change in D
0		
1		
2		
3		
4	5	
5	$5\frac{1}{2}$	
6	6	

GRAPH



Rule:

I	D	Change in D
0	1	
1	$1\frac{1}{3}$	$\frac{1}{3}$
2	$1\frac{2}{3}$	$\frac{1}{3}$



Rule:

Mathematician:

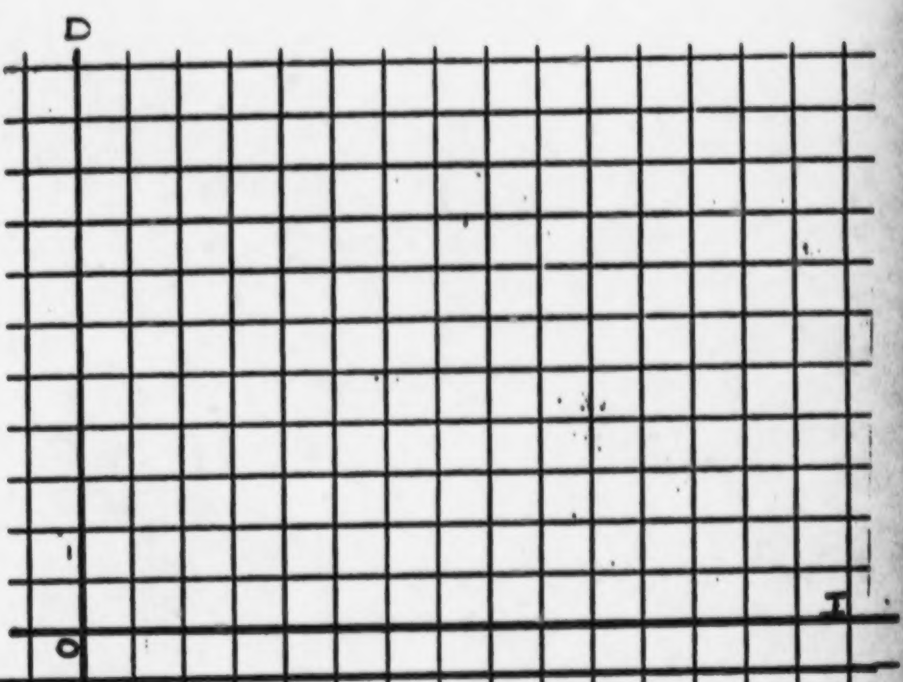
"I completed each table of values for D and I, found the constant change in D and the rule and graphed this."

TABLE

I	D	Change in D
0	2	
		5
		5
		5
		5
		5

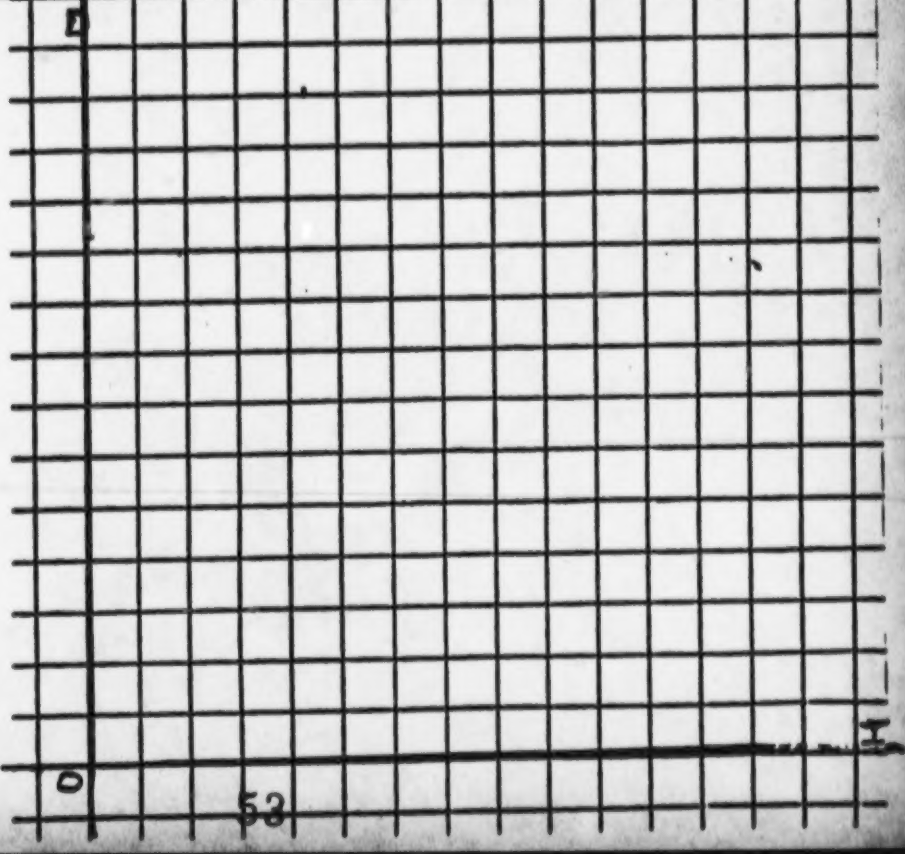
RULE:

GRAPH



I	D	Change in D
1	3	
2	5	
3	7	

Rule:



Mathematician:____

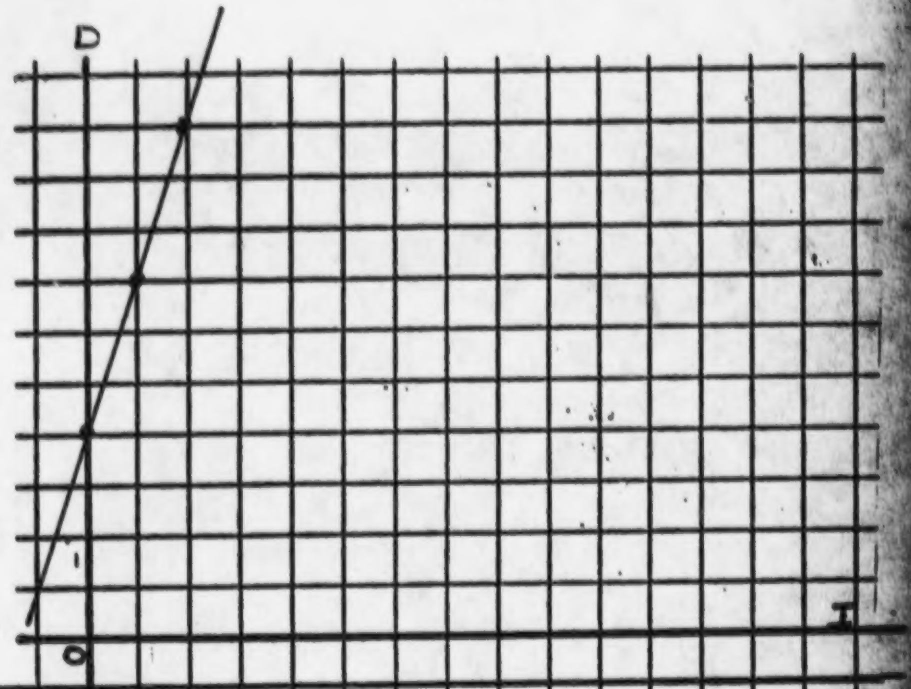
"I completed each table of values for D and I, found the constant change in D and the rule and graphed this."

TABLE

GRAPH

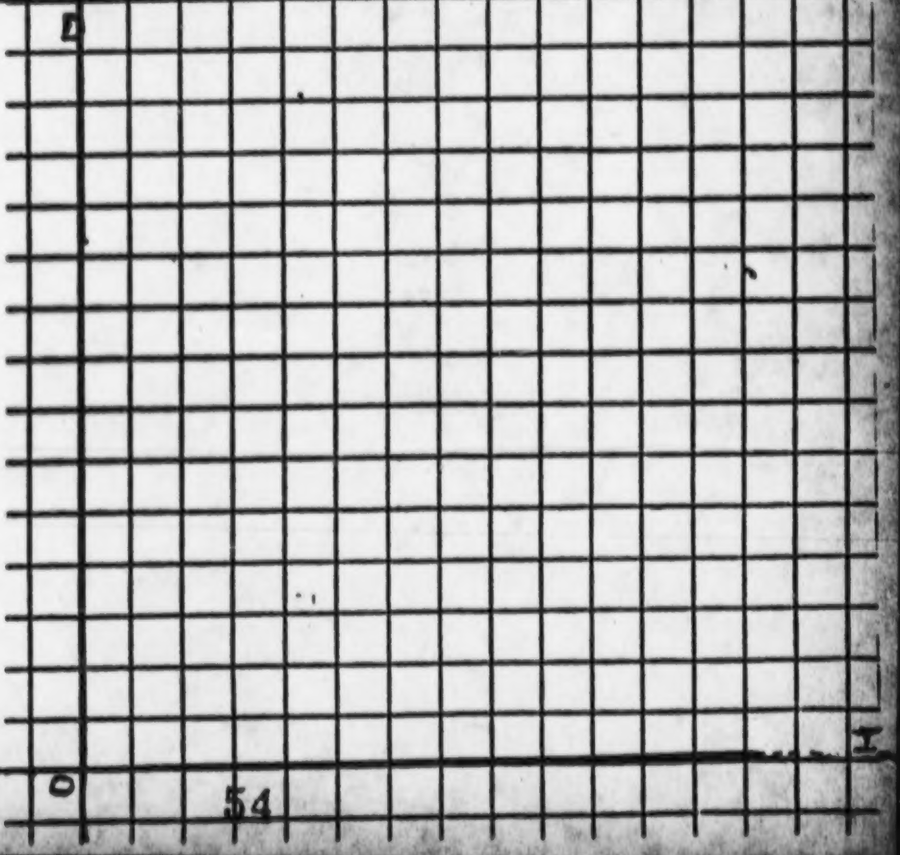
Example:

I	D	Change in D
0	4	
		3
1	7	
		3
2	10	
		3
3	13	
		3
4	16	



Rule:

I	D	Change in D
0	2	
1	3	
2	4	
3	5	



Rule:

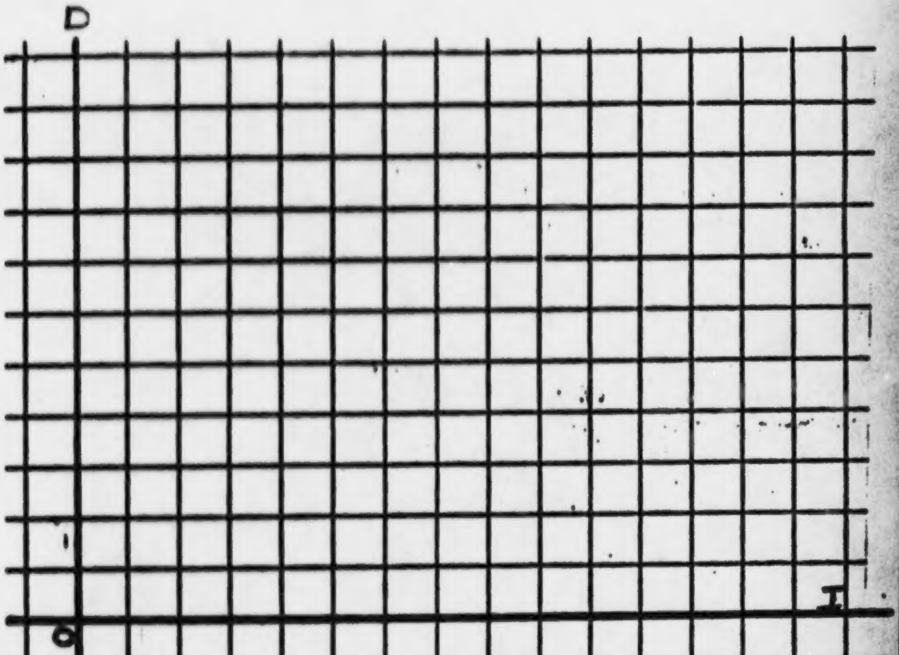
Mathematician:____

"I completed each table of values for D and I, found the constant change in D and the rule and graphed this."

TABLE

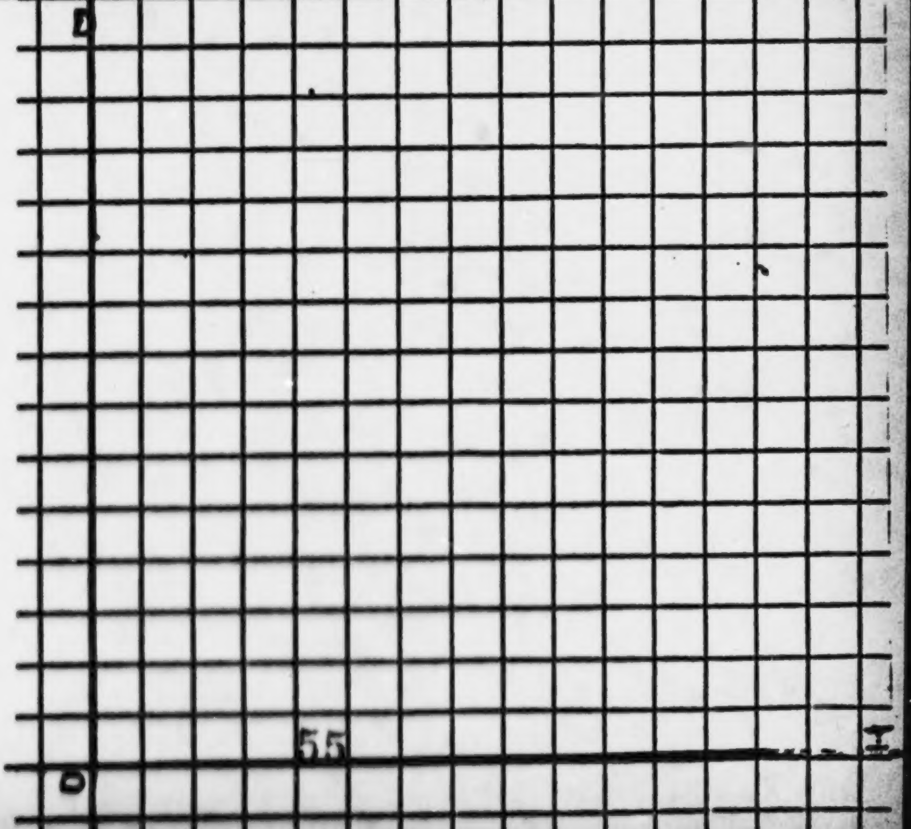
I	D	Change in D
0	3	
		2
		2
		2
		2
		2

GRAPH



Rule:

I	D	Change in D
		4
1	5	4
2	9	4



Rule:

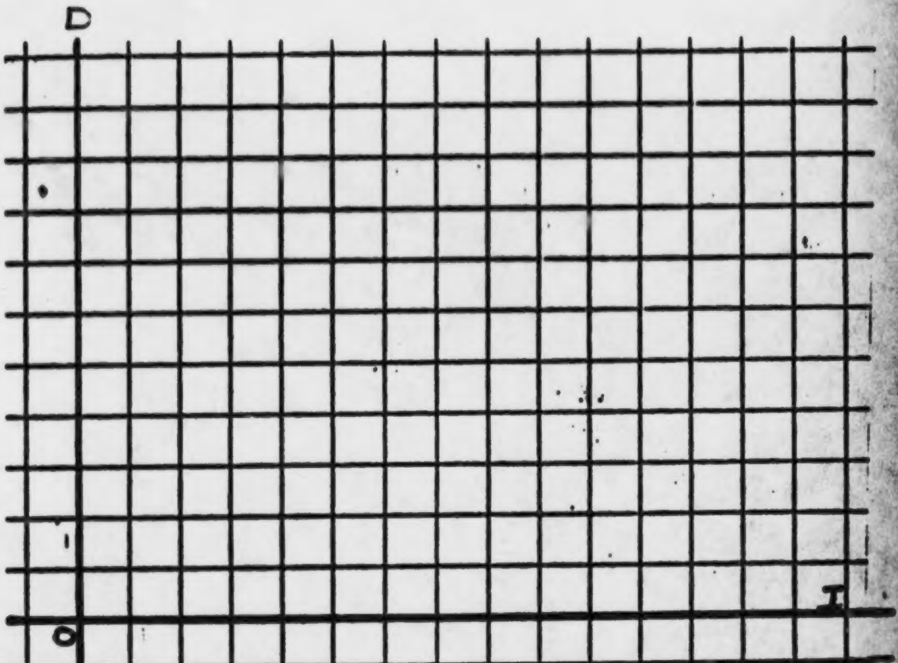
Mathematician:____

"I completed each table of values for D and I, found the constant change in D and the rule and graphed this."

TABLE

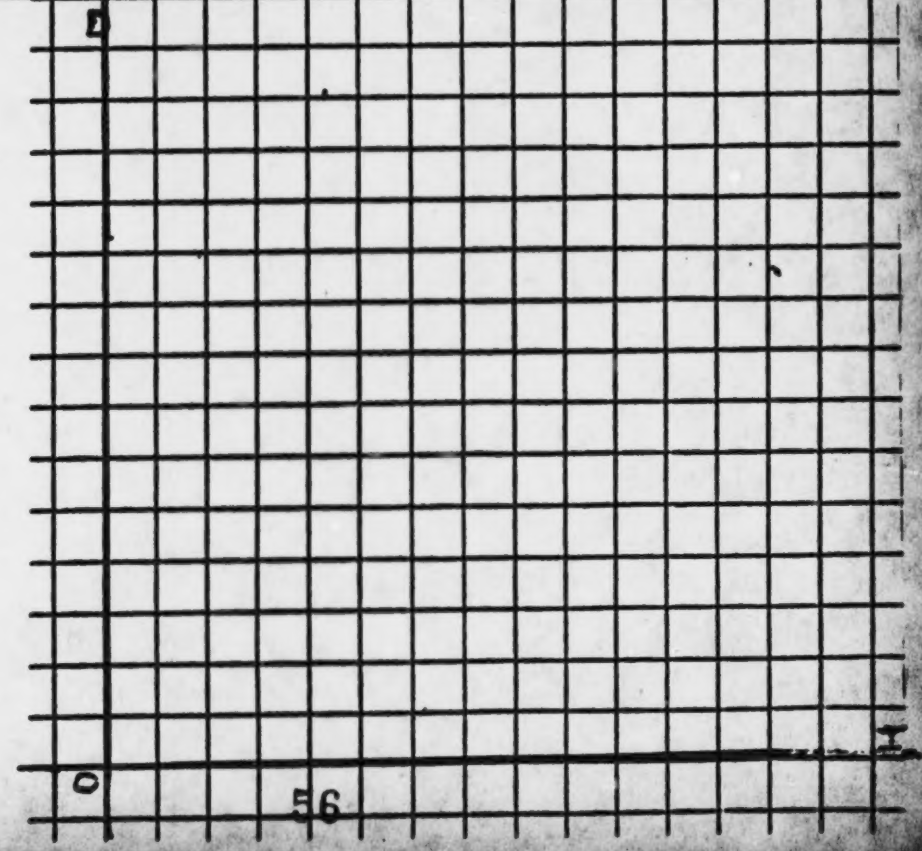
I	D	Change in D
0	0	
1	3	
2	6	
3	9	

GRAPH



RULE:

I	D	Change in D
0	-2	
1	1	3



Rule:

Mathematician: ____________________

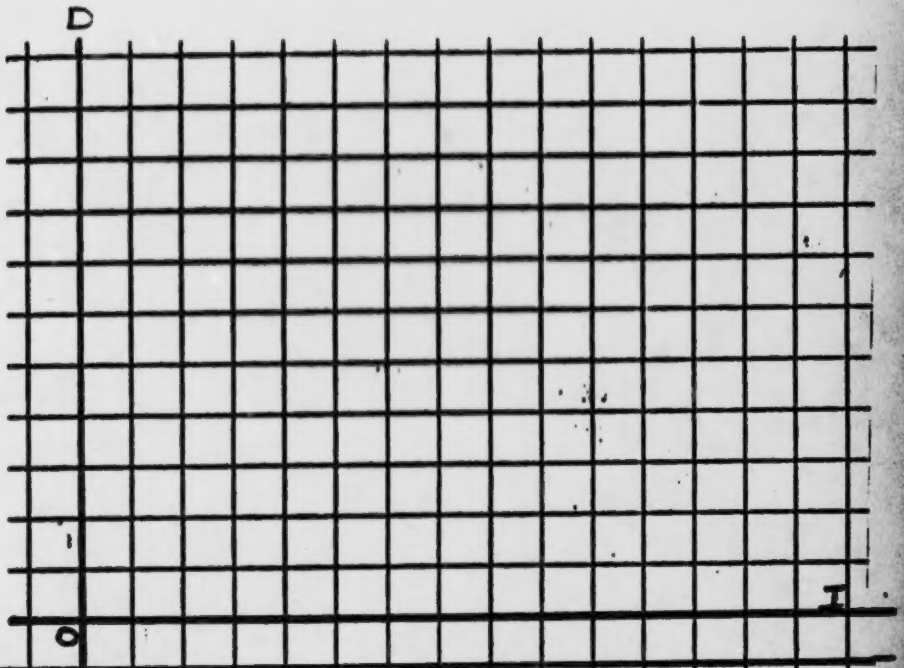
"I completed each table of values for D and I, found the constant change in D and the rule and graphed this."

TABLE

I	D	Change in D
4	5	
5	$5\frac{1}{2}$	
6	6	

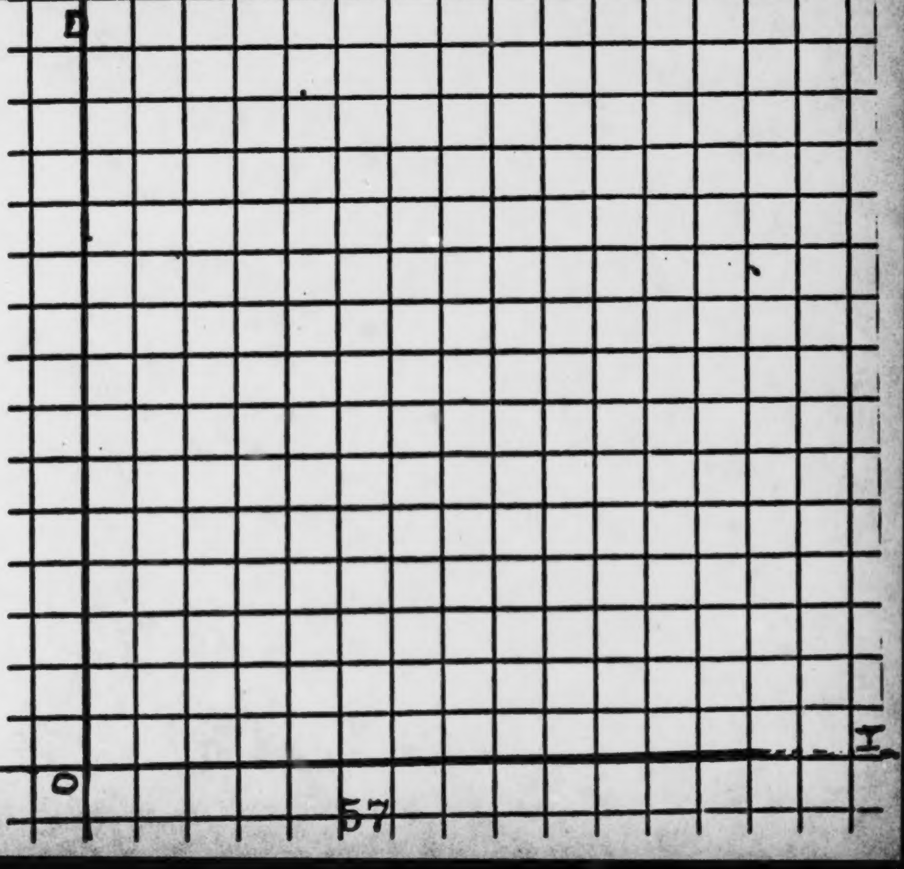
RULE:

GRAPH



I	D	Change in D
0	0	
1	.1	
2	.2	
3	.3	
4	.4	
5	.5	

Rule:



Mathematician:________________________________

"I completed the table for these ratios and found the missing term in the proportions."

"There are 3 blue buttons for every 5 brown buttons in a box."

Blue buttons	3										
Brown	5										
Total	8										

6:10 = 15 : ☐

20:32 = 25 : ☐

15: ☐ =21:56

☐ :40 = 30:50

"For every 2 students with brown hair in Northern Elementary school, one can find 3 students with blonde hair."

Brown Hair	2										
Blonde Hair	3										
Total	5										

10:30 = ☐ :21

8:24 = ☐ : 30

6:15 = 10: ☐

15:25 = ☐ : 50

Review ratio and proportion

1.31.87.1

Mathematician: ____________________

"A grocer stocks 6 loaves of white bread for every loaf of rye bread."

White bread											
Rye Bread											
Total											

3: ☐ = 5: 30

30 : 5 = ☐ : 6

☐ :14 = 24: 28

4 : 28 = 5 : ☐

"Tom has 4 red marbles for every 7 green marbles."

Red marbles											
Green marbles											
Total											

8: 14 = 12: ☐

7 : 4 =21 : ☐

4 : 11 = ☐ : 66

11 : 7 = ☐ : 28

1.31.89.1a

Mathematician:____

"I found totals using the rates given. I cancelled units to get the correct units for the totals."

RATE | **TABLE OF TOTALS**

50¢ per box

Units EXAMPLE:

boxes	number of things	1	2	3	4	5	6	7
¢	Total	50	100	150	200	250	300	350

12 in. per foot

Units

	number of things							
	Total							

3 ft. per yard

Units

	number of things							
	Total							

5 boys per room

Units

	number of things							
	Total							

18 mi per gal.

Units

	number of things							
	Total							

3 tsp per Cup

Units

	number of things							
	Total							

Mathematician:____

"I found totals using the rates given. I cancelled units to get the correct units for the totals."

RATE | **TABLE OF TOTALS**

8 strings per guiter

Units

	number of things							
	Total							

60 mi per hour

Units

	number of things							
	Total							

$5 per lb.

Units

	number of things							
	Total							

6 lbs per day

Units

	number of things							
	Total							

7 grams per liter

Units

	number of things							
	Total							

3 oz. per cup

Units

	number of things							
	Total							

C.1.8.1

Mathematician:______________________________

"For the situations given I completed the table, wrote the equation and the ratio."

Example:

"Tuna costs 60¢ per can."

¢	60	120	180	240	300	360	420	480	540	600
cans	1	2	3	4	5	6	7	8	9	10

¢ : cans = 60 : 1

$\text{Total ¢} = \frac{60¢}{\text{can}} \times \square$ cans

"Tom's sister runs a steady 8 meters/sec."

Meters											
Seconds											

meters : seconds = 8: 1

Total meters = $\frac{\square}{\square} \times \square$ ______

"Jerry bought apples that cost 25¢ each."

¢									
Apples									

Ratio

Equation

C1.572

"A paint formula calls for 1/2 oz. of pigment "A" for each quart of paint.

oz. pigment A		1/2							
paint	1 pt.	1 qt.	2 qts.	3 qts.	1 gal.	5 qts.	6 qts.	7 qts.	2 gal.

ratio oz. pigment : qts. paint = 1 : 2

equation

"An outboard engine calls for 4 oz. of oil for each gallon of gasoline."

oz. oil											
gal. gas.											

Ratio oz. oil ": gal. gasoline = ☐ : ☐

"Joyce gets $2 per hour for babysitting."

hours									
Total pmt.									

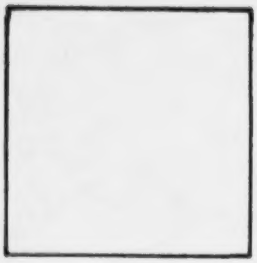
Ratio $: hours =

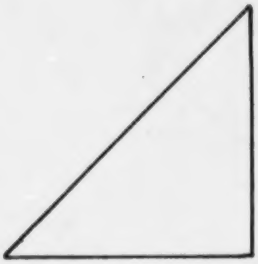
Equation

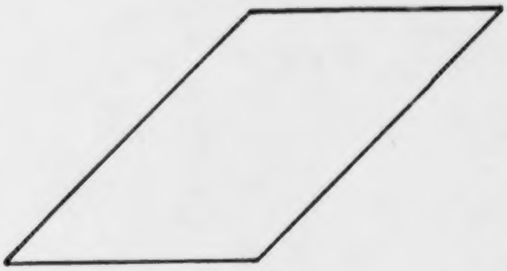
Mathematician:____

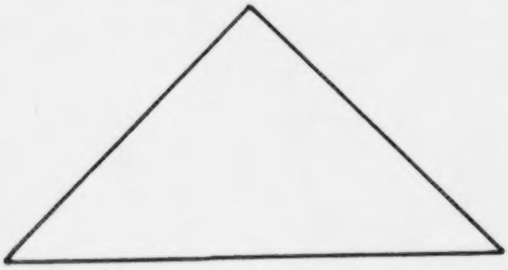
"I wrote the rule for this set of shapes."

THESE SHAPES FOLLOW THE RULE

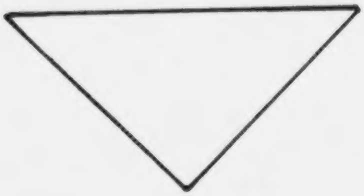


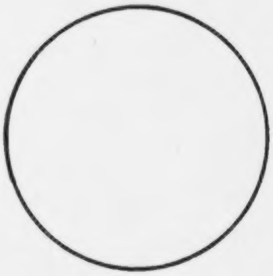


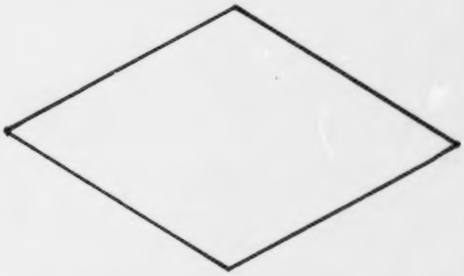


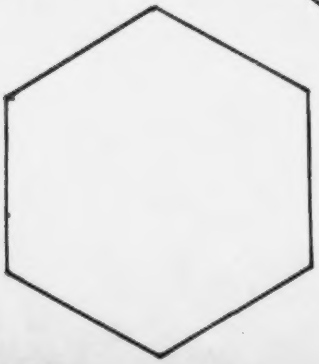


THESE SHAPES DO NOT FOLLOW THE RULE







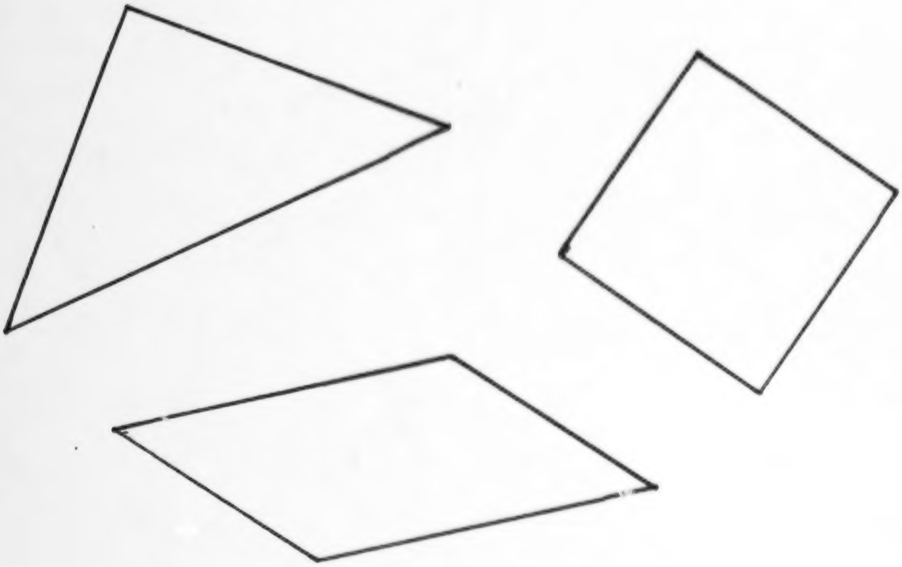


4.18.87.2

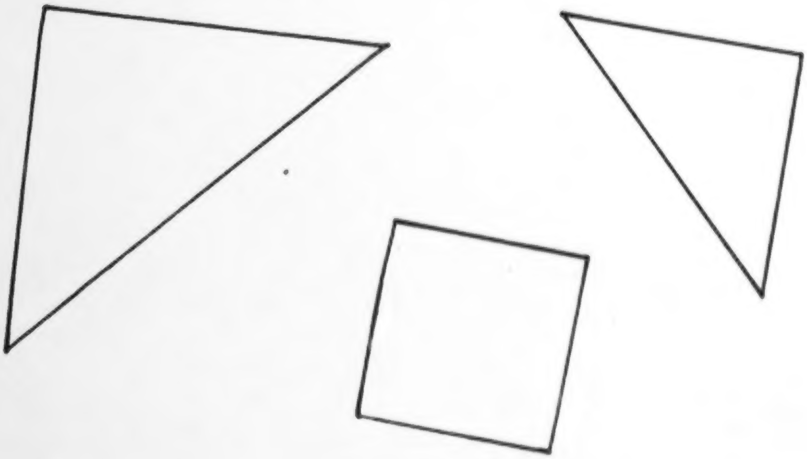
Mathematician:____

"I wrote the rule for this set of shapes."

THESE SHAPES FOLLOW THE RULE



THESE SHAPES DO NOT FOLLOW THE RULE

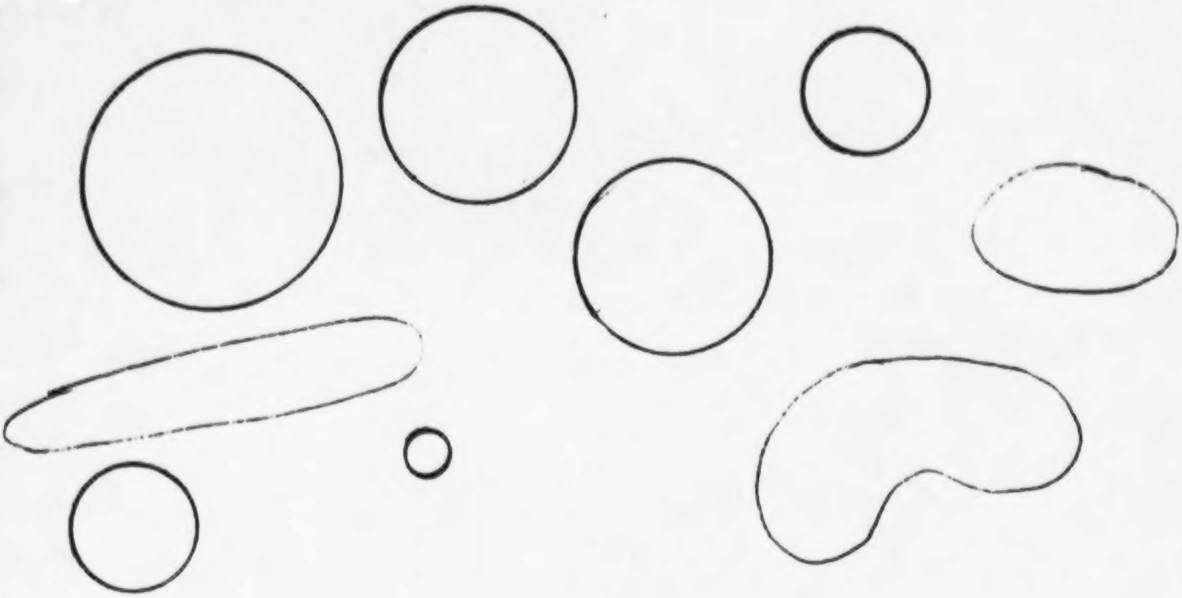


4.15.87.2

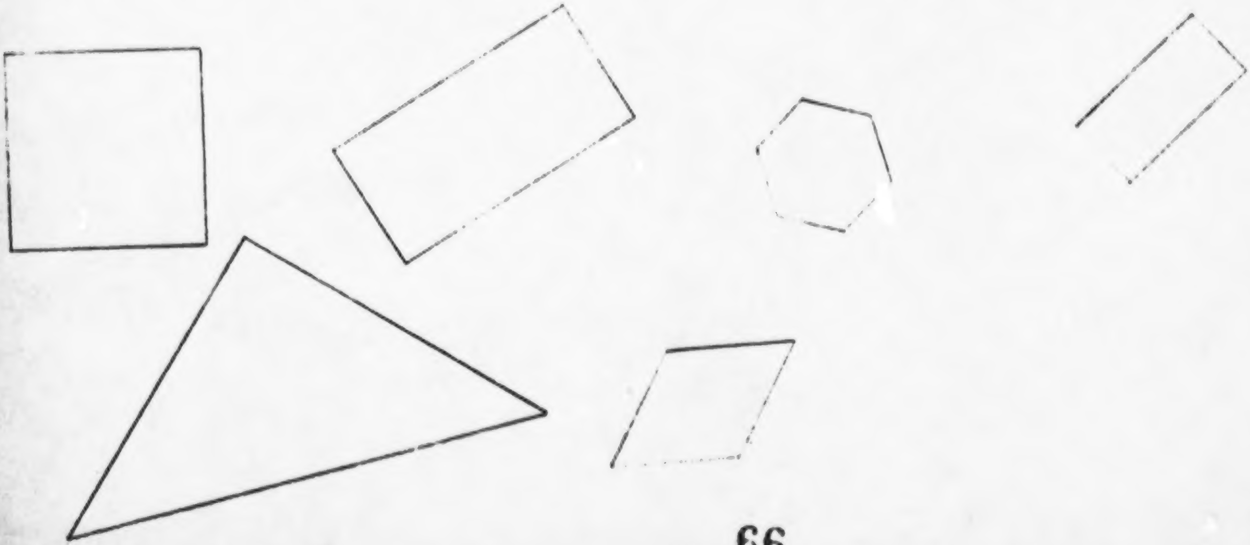
Mathematician:____

"I wrote the rule for this set of shapes."

THESE SHAPES FOLLOW THE RULE



THESE SHAPES DO NOT FOLLOW THE RULE

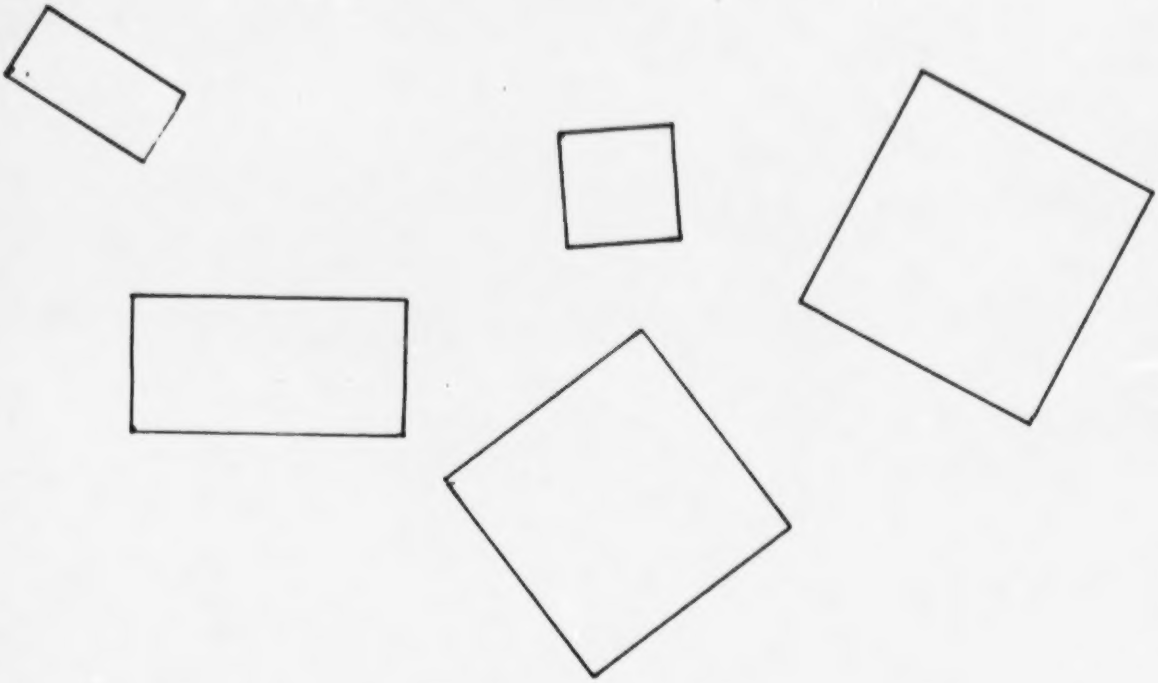


4.18.33.2

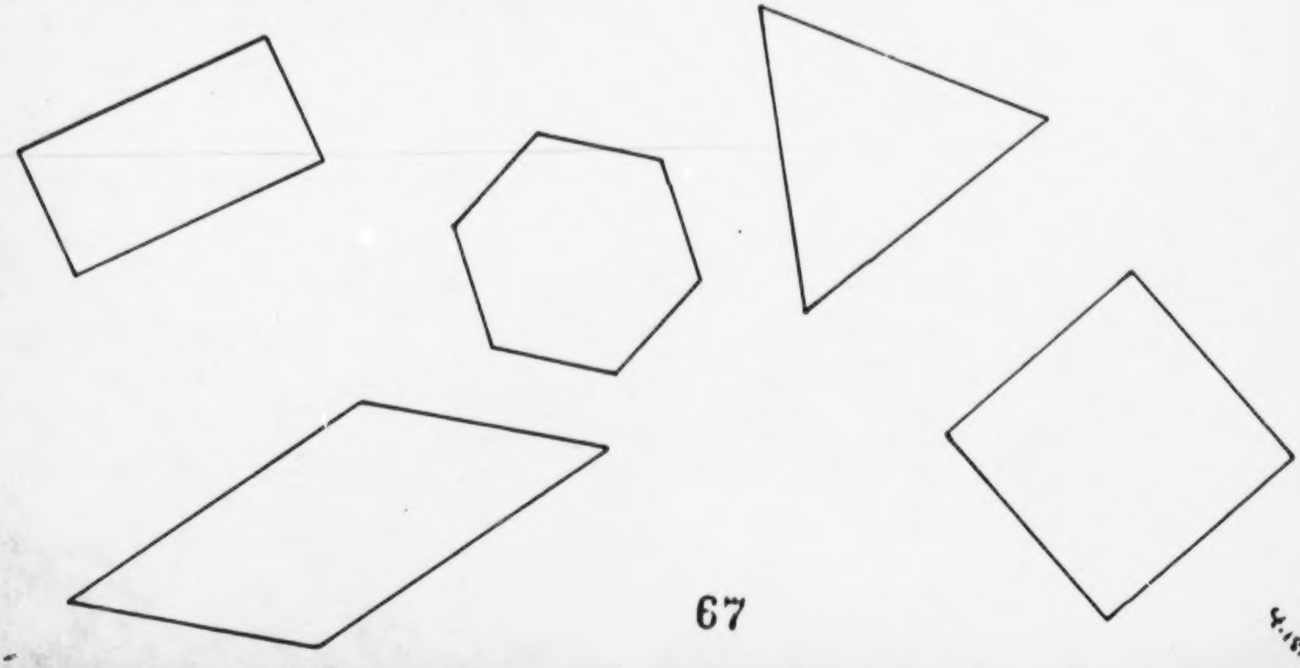
Mathematician:________________________________

"I wrote the rule for this set of shapes."

THESE SHAPES FOLLOW THE RULE



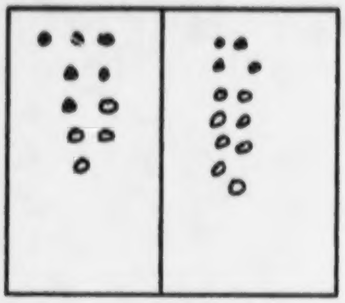
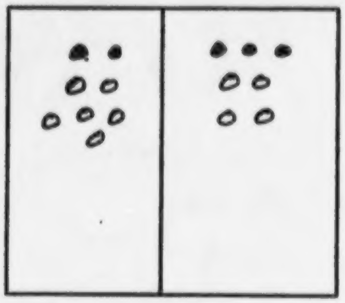
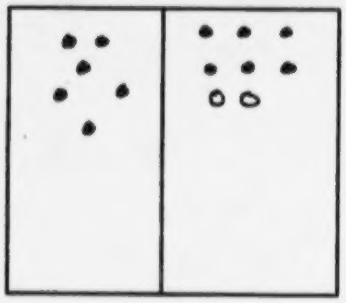
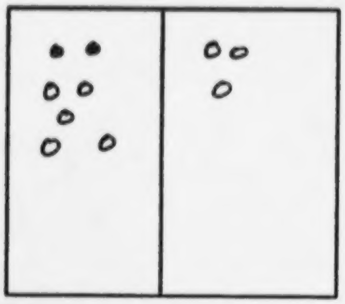
THESE SHAPES DO NOT FOLLOW THE RULE



4.15.87.2

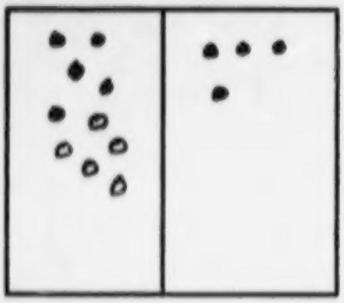
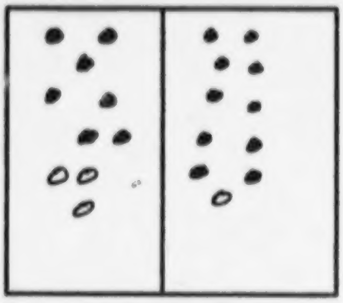
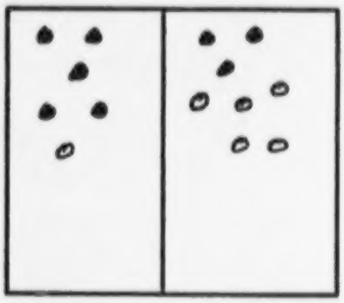
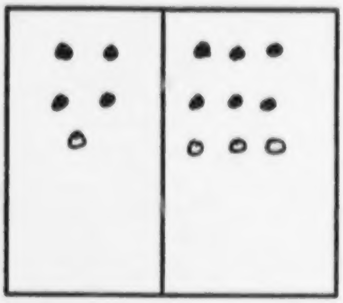
Mathematician:____

"I wrote the equality or inequality shown by the split board with chips."

SPLIT BOARD	NUMBER STATION
 Example	$2 > {}^{-}4$
	
	
	

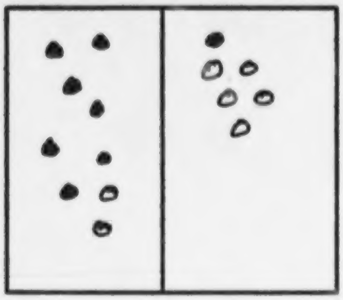
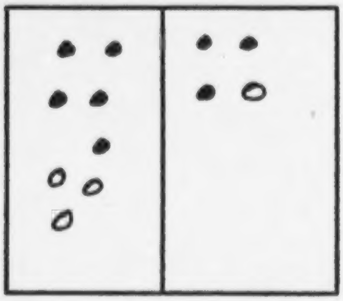
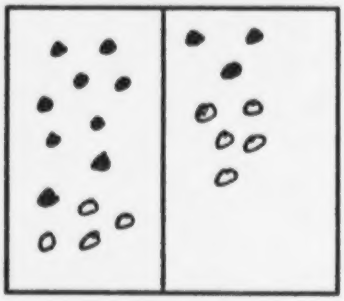
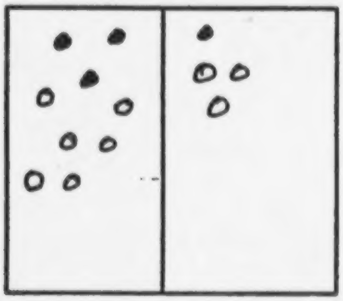
Mathematician:____

"I wrote the equality or inequality shown by the split board with chips."

SPLIT BOARD	NUMBER STATION
	
	
	
	

Mathematician:____

"I wrote the equality or inequality shown by the split board with chips."

SPLIT BOARD	NUMBER STATION
	
	
	
	

6.12.89.11

Mathematician:____

"I added or subtracted the number as shown to get a new equation or inequality."

NUMBER SENTENCE	HOW TO CHANGE	NEW SENTENCES
Example: $4 < 7$	$^{-}2$	$2 < 5$
$12 = \square + 3$	$^{-}3$	$9 = \square$
$6 > -1$	$+2$	
$2\square + 5 = 15$	-5	
$9 > 2$	$+6$	
$^{-}2 > {}^{-}6$	$+4$	
$3\square - 4 = 18$	$^{+}4$	
$0 > {}^{-}2$	$^{-}3$	
$5 > 3$	$^{-}3$	

Mathematician:____

"I added or subtracted the number as shown to get a new equation or inequality."

NUMBER SENTENCE	HOW TO CHANGE	NEW SENTENCES
$9 = 2\square + 1$	-1	
$8 > 2$		$6 > 0$
$\square + 5 = 13$		$\square = 8$
$9 > 1$	-5	
$2 < 6$	-2	
$-1 < 4$	$+3$	
$-3 < 2$	-4	
$5 < 12$	-4	
$8 < 17$	-7	

Mathematician:____

"I completed these number sentences with signed numbers."

$2\square + (^{-}4) = 10$	$\square + 7 < 16$ five numbers that fill the box are:
$\square - (^{-}1) = 4$	$\square - 3 > 9$ five numbers that fill the box are:
$8 = 2\square - 6$	$7 > \square + 3$ five numbers that fill the box are:
$15 > 12 - \square$ five numbers that fill the box are! BE CAREFUL!	$8 - \square = 5$
$16 - 2\square = 9$	$8 - \square < 16$ What is one number that CANNOT Go in the box?
$2\square + 1 > 9$	$\square - (^{-}4) < 6$ five numbers that fill the box are:

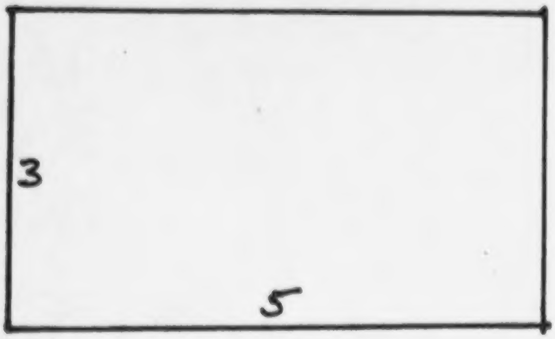
Mathematician:____

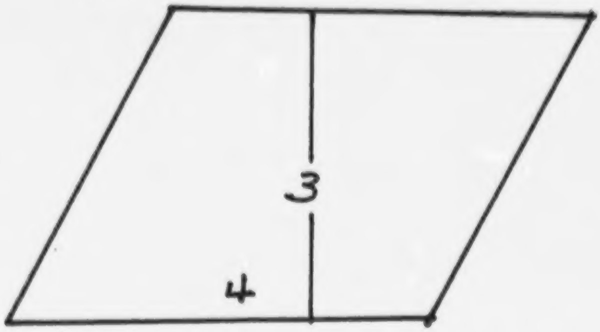
"I completed these number sentences with signed numbers."

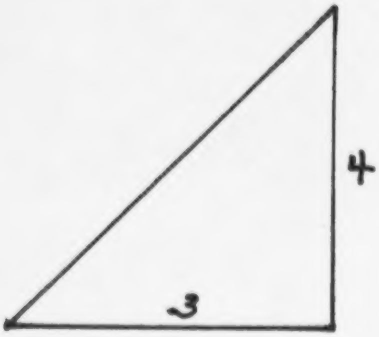
$3\square + (^{-}1) = 14$	$6 + \square < {}^{-}7$ Name five numbers that can go into the box!
$18 = 4\square + 2$	$5 < 2\square - 1$ Name five numbers that can go in the box!
$8 > \square + (^{-}2)$ Name five numbers that can go into the box!	$21 = 2\square + 17$
$3\square + (^{-}4) = 11$	$3\square + 1 < 16$ Name five numbers that can go in the box!
$\square + (^{-}4) < 2$ Name five numbers that can go in the box!	$3\square + 1 = 16$
$2\square + (^{-}4) = 14$	$0 > \square + (^{-}2)$

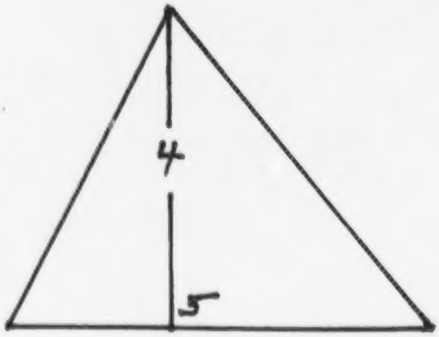
MATHEMATICIAN:______________________________

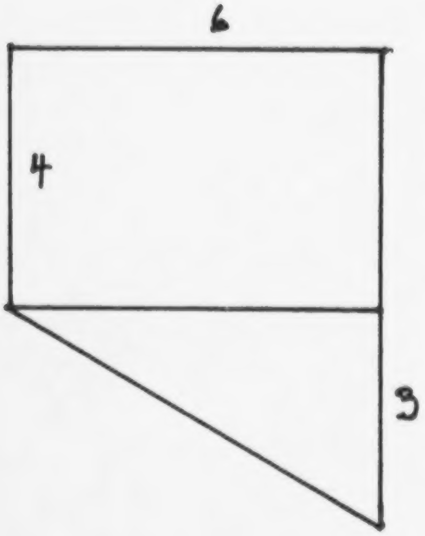
"I found the areas for the shapes given."

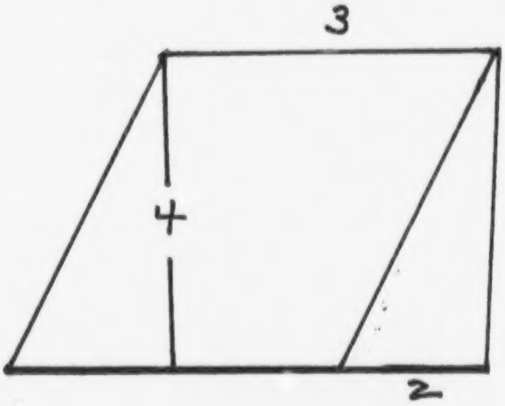






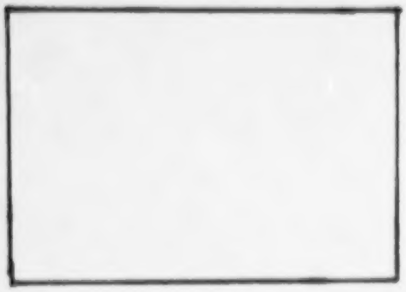


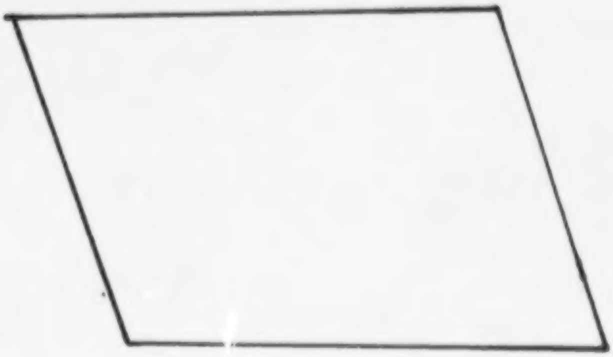


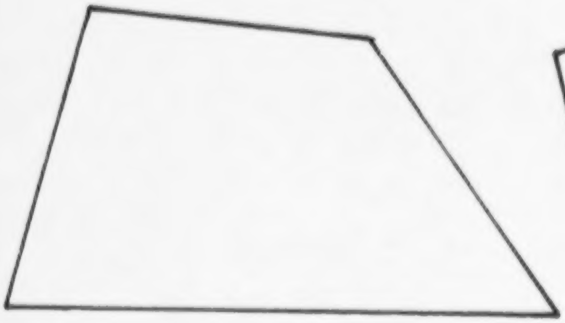


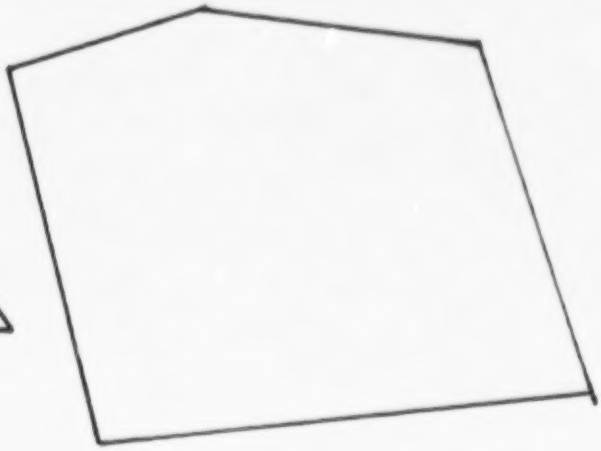
Mathematician:____

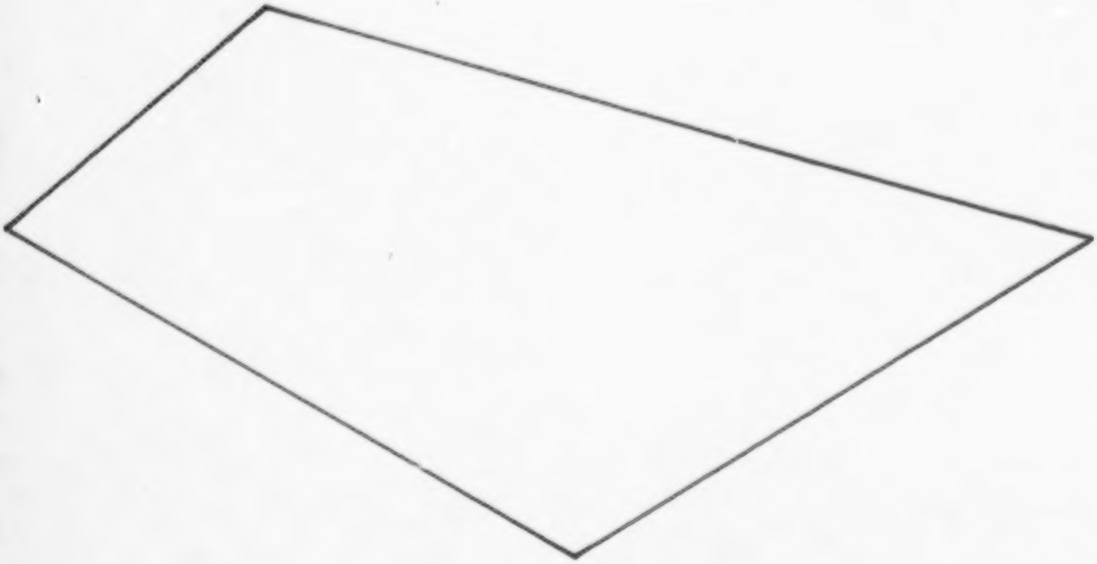
"I used the graph paper transparency to find the areas of these rectangles and other parallelograms. I wrote the area on the shape."





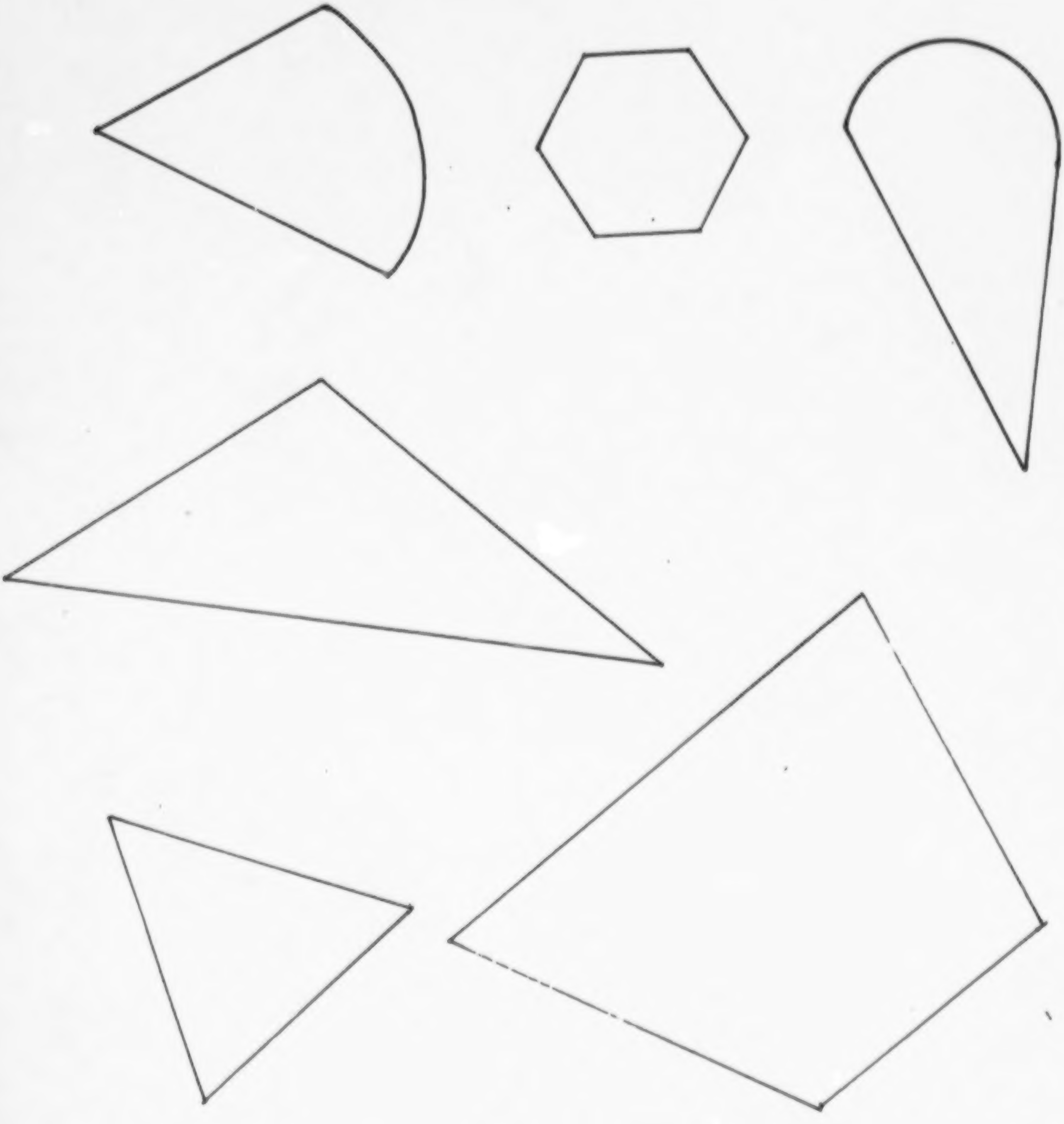






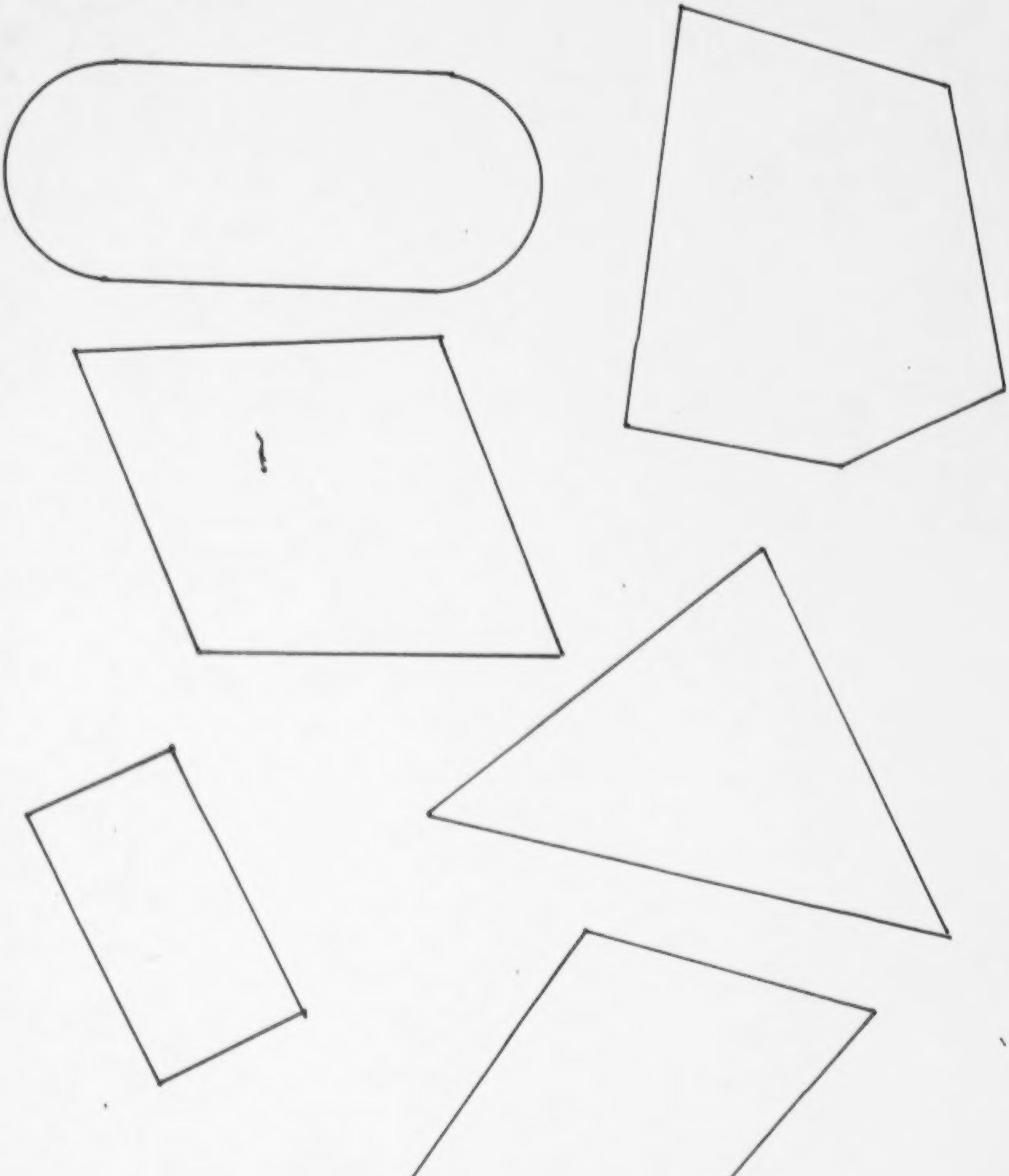
Mathematician:____

"I used the graph paper transparency to find the areas of these rectangles and other parallelograms. I wrote the area on the shape."



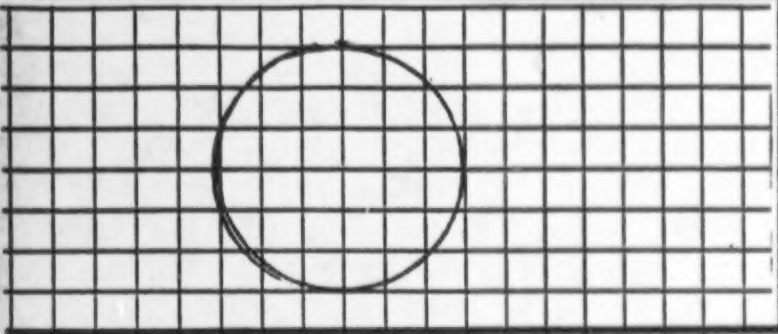
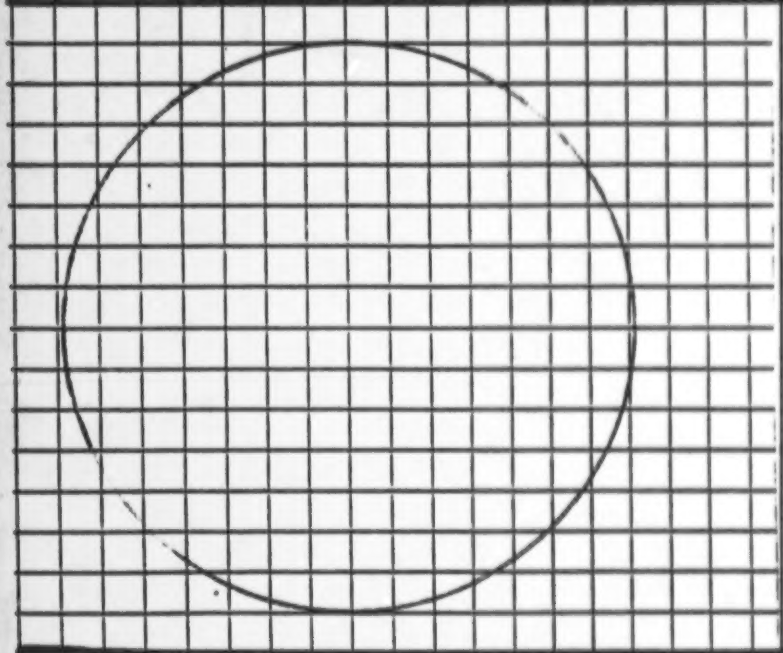
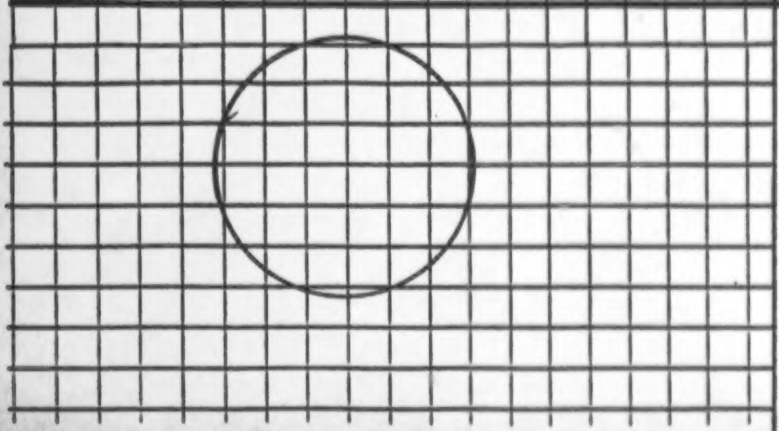
Mathematician:____

"I used the graph paper transparency to find the areas of these rectangles and other parallelograms. I wrote the area on the shape."



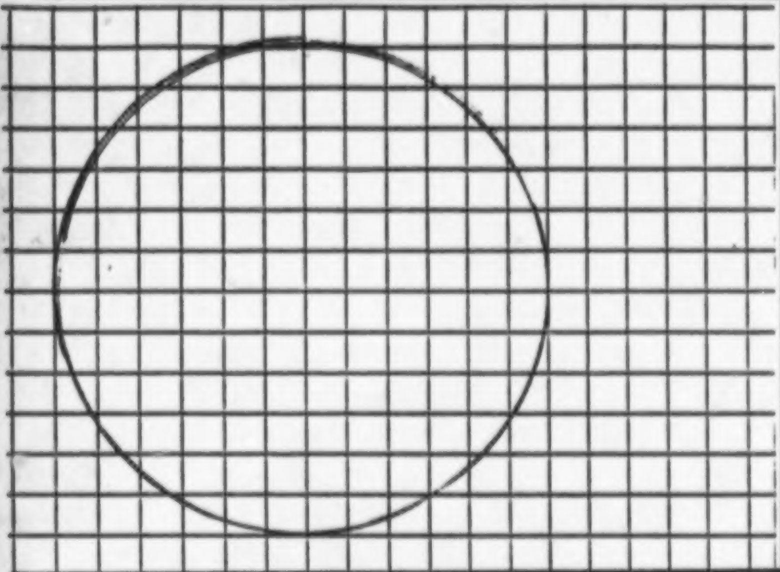
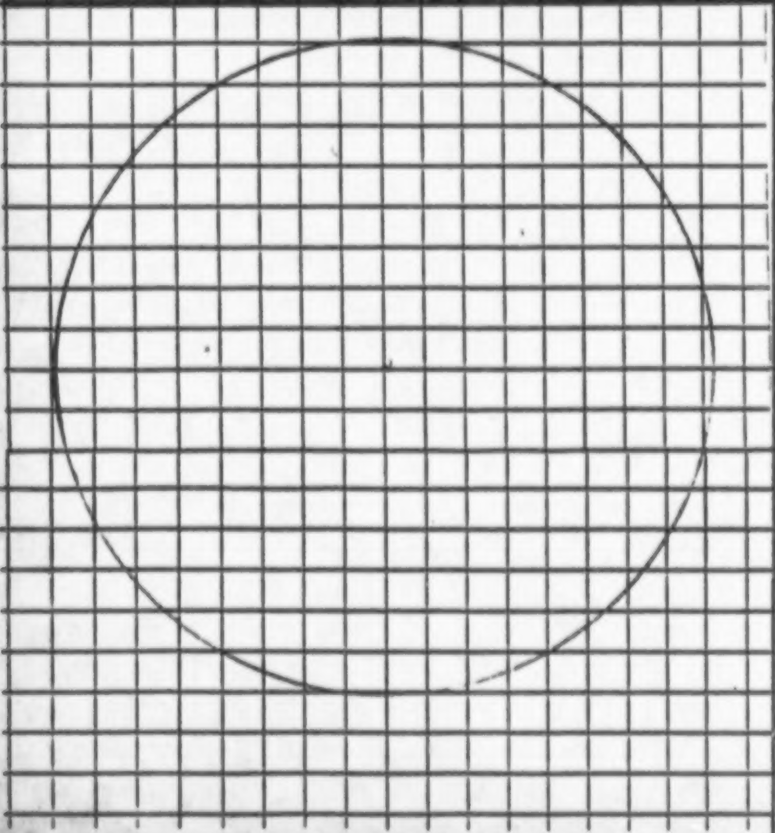
Mathematician:____

"For the circles given I found the area as best I could and calculated the radius. I put these all in the table."

CIRCLES	AREA	RADIUS	RADIUS^2
			
			
			

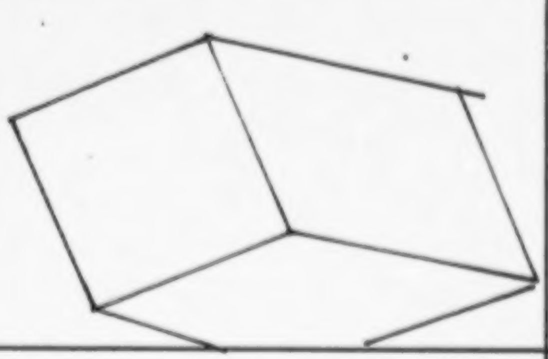
Mathematician: ____________________________________

"For the circles given I found the area as best I could and calculated the radius. I put these all in the table."

CIRCLES	AREA	RADIUS	RADIUS ^{2}
			
			

Mathematician: ______________________________

"Given the dimensions of the base and the height of solids, I found the volumes."

GIVEN DIMENSION	PICTURE OF SOLID	VOLUME
Base: 9 sq. in. height: 6 in.		9 x 6 = 54 cu ins
Base: Rectangle 4 x 6 Height: 3		
Base: Triangle base = 2 height = 3 height = 4		
Base: square 3x3 Height: 5		

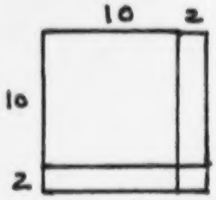
Mathematician:____

"Given the dimensions of the base and the height of solids, I found the volumes."

GIVEN DIMENSION	PICTURE OF SOLID	VOLUME
Height: 6 Base: parallelogram base = 4 height = 3		
Height: = 12 Base: rectangle 3 x 2		
Height: 9 Base: square 5x5		
Base: Circle area = 14.6 Height: 5		

Mathematician:____

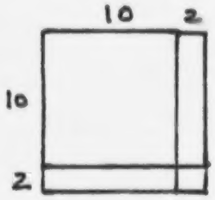
"I built the squares from base ten pieces and made pictures of these."

SQUARE SIDE	PICTURE	COMPUTATION
EXAMPLE: 12		$12^2 = (10+2)^2 = 100 + 2(20) + 4$ $= 144$
13		
14		
15		

2.3.87.3

Mathematician:____

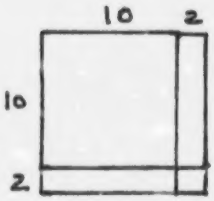
"I built the squares from base ten pieces and made pictures of these."

SQUARE SIDE	PICTURE	COMPUTATION
EXAMPLE: 12		$12^2 = (10+2)^2 = 100 + 2(20) + 4$ $= 144$
$T + 3$		
$T + 4$		
$T + 5$		

2.3.47.3

Mathematician:____________________

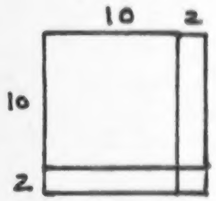
"I built the squares from base ten pieces and made pictures of these."

SQUARE SIDE	PICTURE	COMPUTATION
EXAMPLE: 12		$12^2 = (10+2)^2 = 100 + 2(20) + 4$ $= 144$
16		
17		
18		

2.3.89.3

Mathematician:____

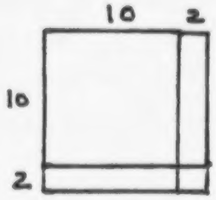
"I built the squares from base ten pieces and made pictures of these."

SQUARE SIDE	PICTURE	COMPUTATION
EXAMPLE: 12		$12^2 = (10+2)^2 = 100 + 2(20) + 4$ $= 144$
19		
T+1		
T+2		

2.3.87.3

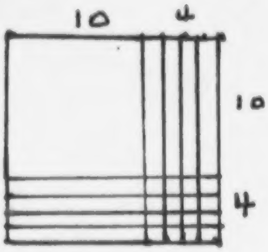
Mathematician:____

"I built the squares from base ten pieces and made pictures of these."

SQUARE SIDE	PICTURE	COMPUTATION
EXAMPLE: 12		$12^2 = (10+2)^2 = 100 + 2(20) + 4$ $= 144$
$T + W$		
$T + 2W$		
$T + 3W$		

Mathematician:____

"I drew pictures of these squares and wrote out all products."

SQUARE SIDE	PICTURE	PRODUCTS
Example: 14		$(10+4)^2 = 100 + 2(40) + 4^2$ $= 100 + 80 + 16$ $= 196$
13		
12		
11		

Mathematician:________________________________

"I drew pictures of these squares and wrote out all products."

SQUARE SIDE	PICTURE	PRODUCTS
15		
16		
17		
18		

Mathematician:____

"I drew pictures of these squares and wrote out all products."

SQUARE SIDE	PICTURE	PRODUCTS
19		
20		
21		
22		

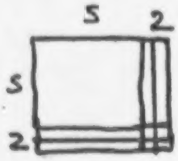
Mathematician: ____________________

"I drew pictures of these squares and wrote out all products."

SQUARE SIDE	PICTURE	PRODUCTS
31		
41		
51		
61		

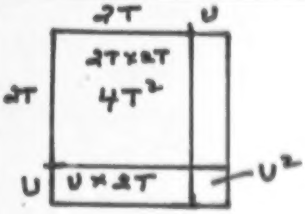
Mathematician:____________________________________

"I drew pictures of these squares and wrote out all products."

SQUARE SIDE	PICTURE	PRODUCTS
$S+2$		$(S+2)^2 = S^2 + 2(s) + 2^2$ $= S^2 + 2S + 4$
$S+3$		
$S+4$		
$S+n$		

Mathematician:____

"I drew pictures of these squares and wrote out all products."

SQUARE SIDE	PICTURE	PRODUCTS
EXAMPLE: $2T + U$	 2T U 2T×2T 4T² 2T U U×2T U²	$(2T)^2 + 2(2TU) + U^2$ $4T^2 + 4TU + U^2 = (2T+U)^2$
$A + 2B$		
$C + D$		
$3M + N$		

Building squares: Base ten blocks

Mathematician:____

"I drew pictures of these squares and wrote out all products."

SQUARE SIDE	PICTURE	PRODUCTS
$4T + 1$		
$2T + 5$		
$3M + 2$		
$B + 6$		

Mathematician:____

"I drew pictures of these squares and wrote out all products."

SQUARE SIDE	PICTURE	PRODUCTS
$Z+3W$		
$X+2y$		
$y+\frac{3}{4}$		
$Z+4$		

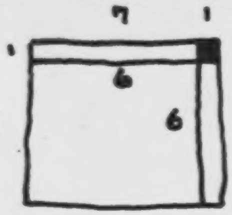
Mathematician: ____________________

"I used the pattern for squaring numbers ending in 5."

NUMBER	COMPUTATION
EXAMPLE: 15	$15^2 = (1\underline{\times 2})25 = 225$
25	$25^2 =$
35	$35^2 =$
45	$45^2 =$
55	$55^2 =$
65	$65^2 =$
75	$75^2 =$
85	$85^2 =$
95	$95^2 =$

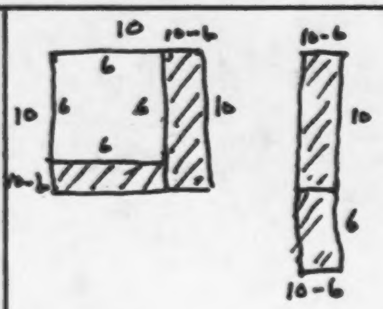
Mathematician:________________________________

"I shrank each square by the amount given to make a new square, drew a picture and wrote out all of the parts in a sentence."

SIDE OF THE GIVEN SQUARE	SHRINK THE SIDE BY	PICTURE	SENTENCE
EXAMPLE: 7	1		$(7-1)^2 = 7^2 - 2 \times 7 + 1$ $= 49 - 14 + 1$ $= 36$ $6^2 = 36$
8	3		
12	1		
11	3		

Mathematician:____

"I found the differences between the given squares and drew the picture."

SQUARE SIDES	PICTURE	DIFFERENCES
Example: 10 and 6	 10 10-6 6 10 6 6 10 6 10-6 10-6 10 6 10-6	$10^2-6^2=(10-6)(10+6)=$ $4\times 16=64$
12 and 10		
15 and 10		
S and T		

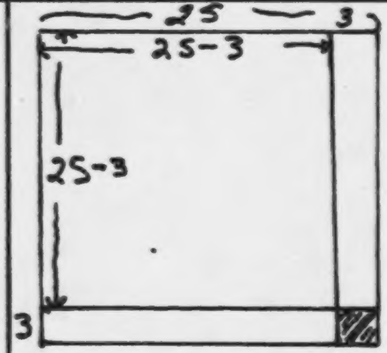
Mathematician: ______________________

"I found the differences between the given squares and drew the picture."

SQUARE SIDES	PICTURE	DIFFERENCES
A and B		
2T and S		
2M and 2N		
X and Y		

Mathematician:____

"I shrank each square by the amount given to make a new square, drew a picture and wrote out all of the parts in a sentence."

SIDE OF THE GIVEN SQUARE	SHRINK THE SIDE BY	PICTURE	SENTENCE
T	1		
2S	3		$(2S-3)^2 = (2S)^2 - 3 \times 2S + 3^2$ $= 4S^2 - 6S + 9$
X	2		
T	$\frac{2}{3}$		

6.12.89.14

Mathematician:______________________________________

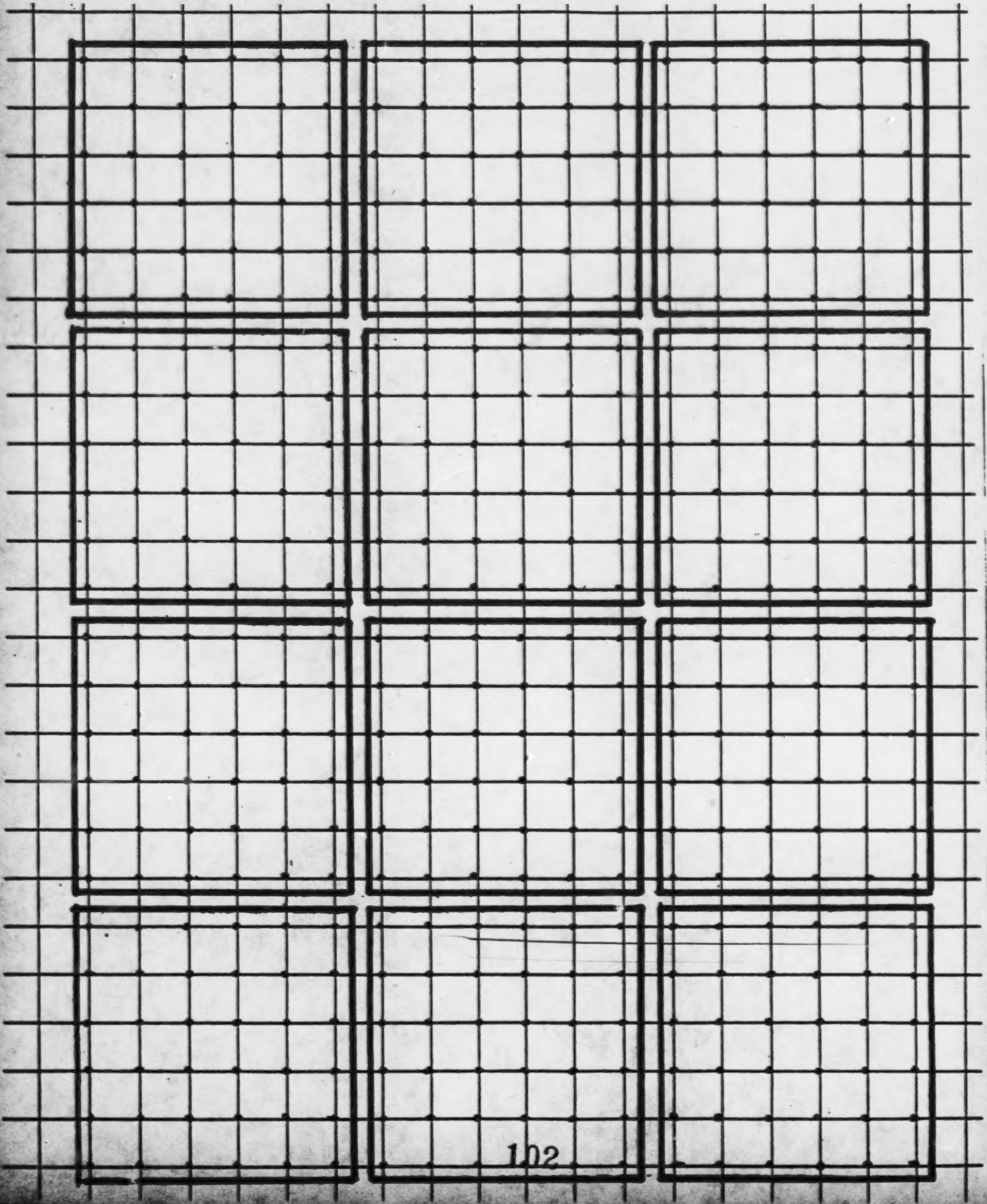
"I shrank each square by the amount given to make a new square, drew a picture and wrote out all of the parts in a sentence."

SIDE OF THE GIVEN SQUARE	SHRINK THE SIDE BY	PICTURE	SENTENCE
12	4		
27	1		
9	5		
10	3		

6.12.89.14

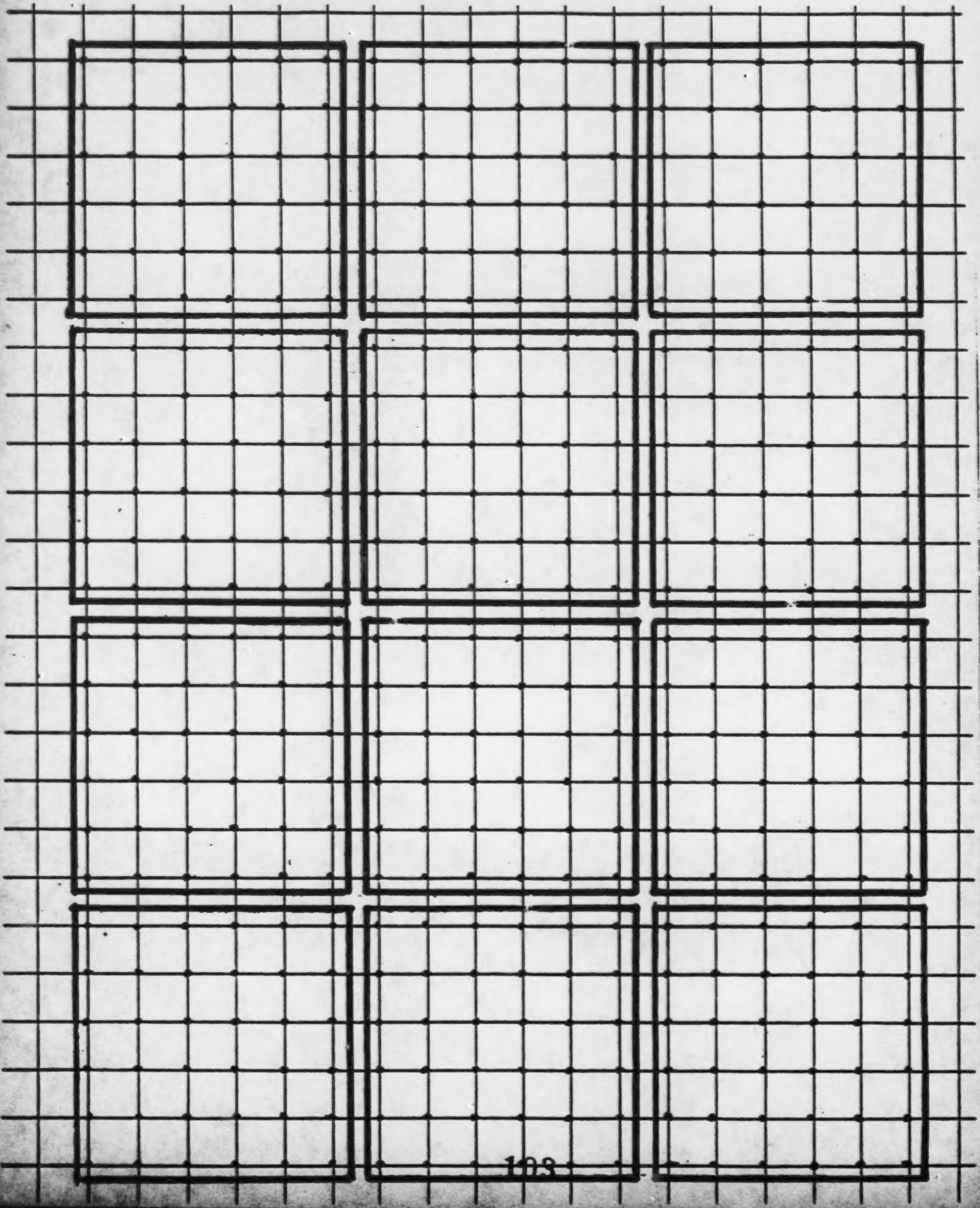
Mathematician:____

"This is my record of tasks done on the geoboard."



Mathematician:____

"This is my record of tasks done on the geoboard."



Mathematician:______________________________

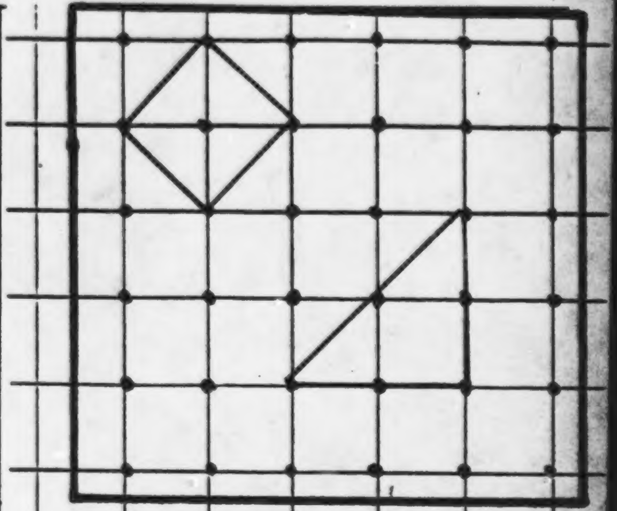
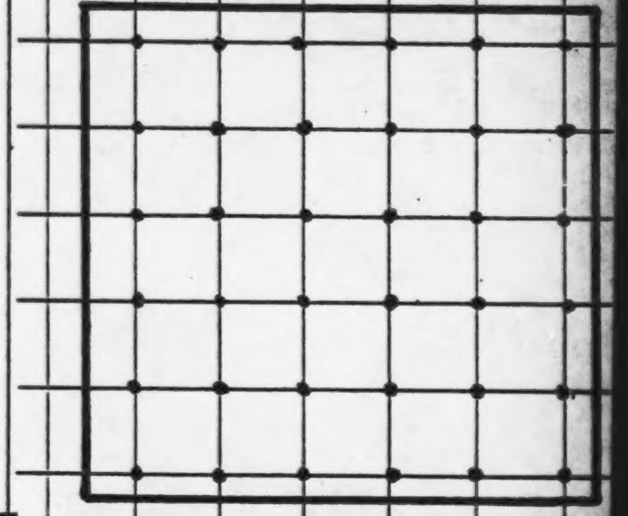
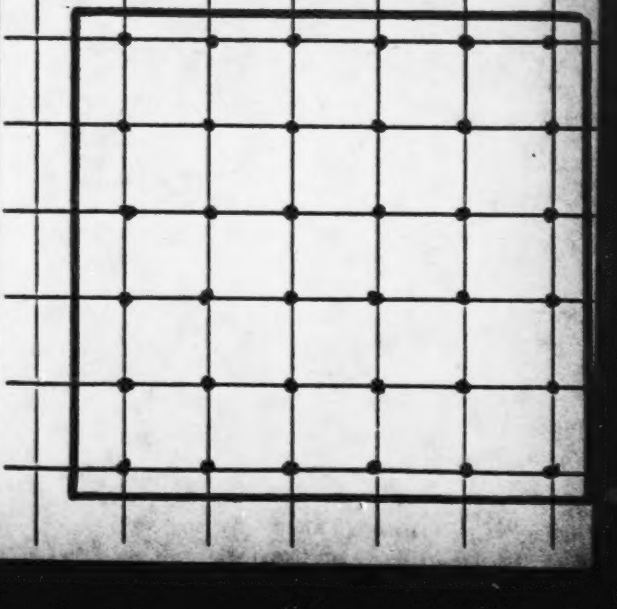
"This is my record of tasks done on the geoboard."

Mathematician: ____

"This is my record of tasks done on the geoboard."

Mathematician: ____________________

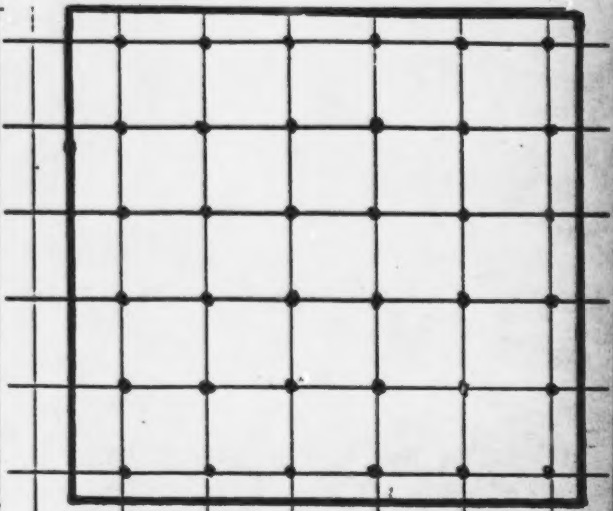
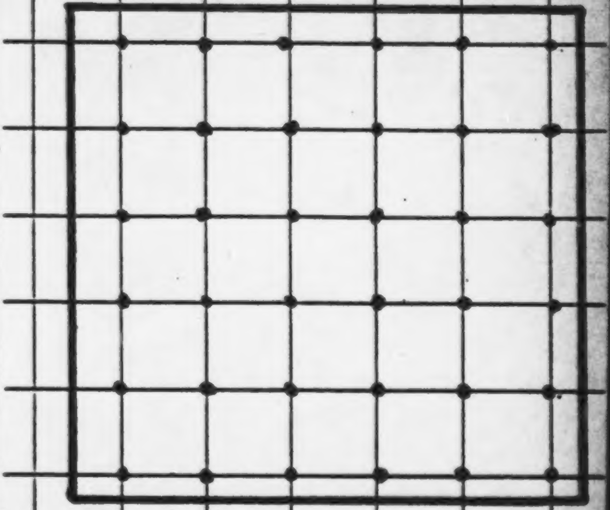
"I made the shapes with the areas given and recorded this on the geoboard picture."

SHAPES	AREA	GEOBOARD
a Triangle and a Square	2	
Two Squares	2 and 5	
Two Triangles	2 and 3	

Geoboard Areas

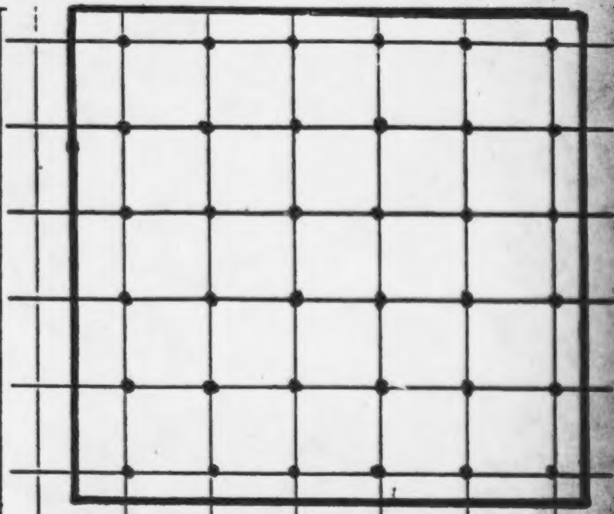
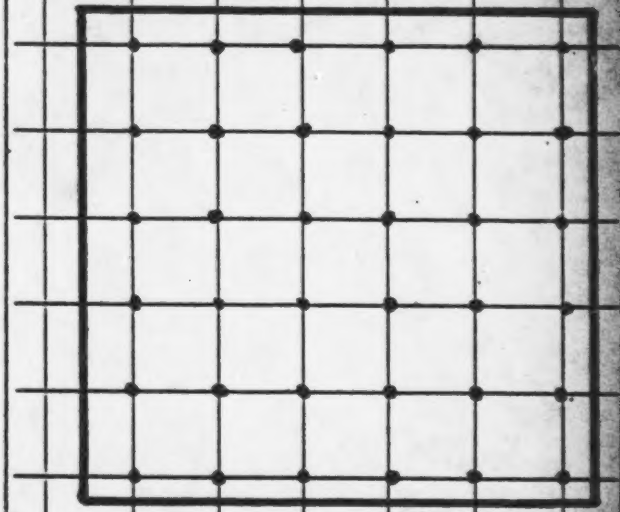
Mathematician:______________________________

"I made the shapes with the areas given and recorded this on the geoboard picture."

SHAPES	AREA	GEOBOARD
Triangle	5	
4 sides	7	
rectangle	6	

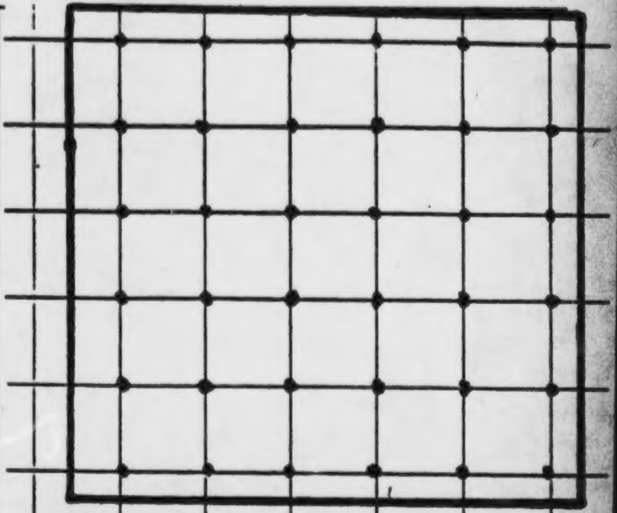
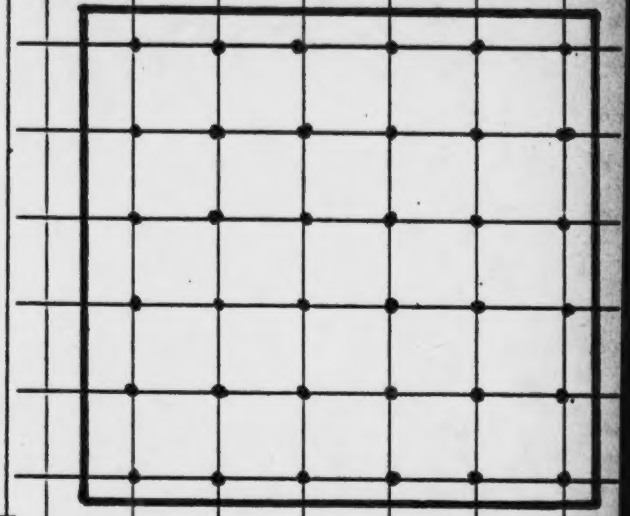
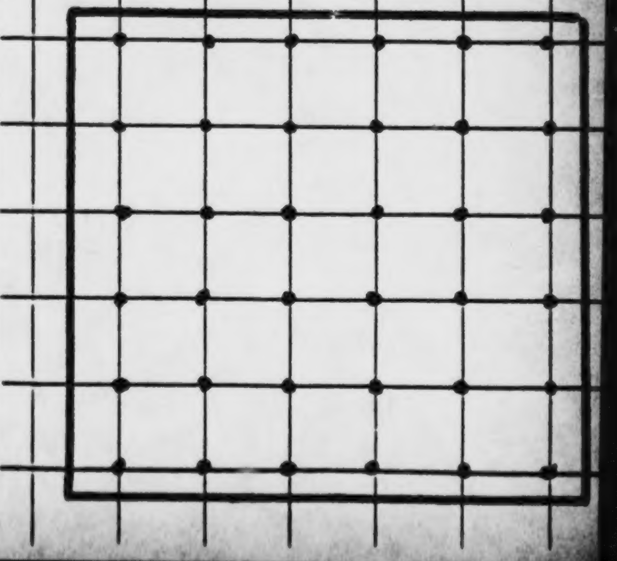
Mathematician:______________________________

"I made the shapes with the areas given and recorded this on the geoboard picture."

SHAPES	AREA	GEOBOARD
Parallelogram	6	
A triangle and a square	equal	
Two Congruent trangles	4	

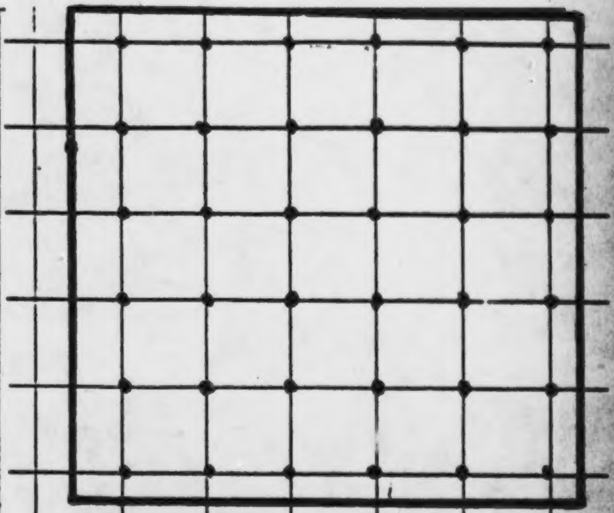
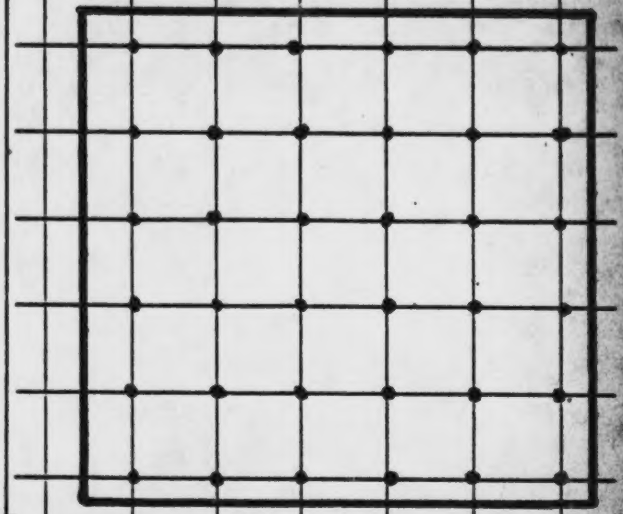
Mathematician:____

"I made the shapes with the areas given and recorded this on the geoboard picture."

SHAPES	AREA	GEOBOARD
SQUARE	10	
2 different rectangles	4	
A right triangle	4	

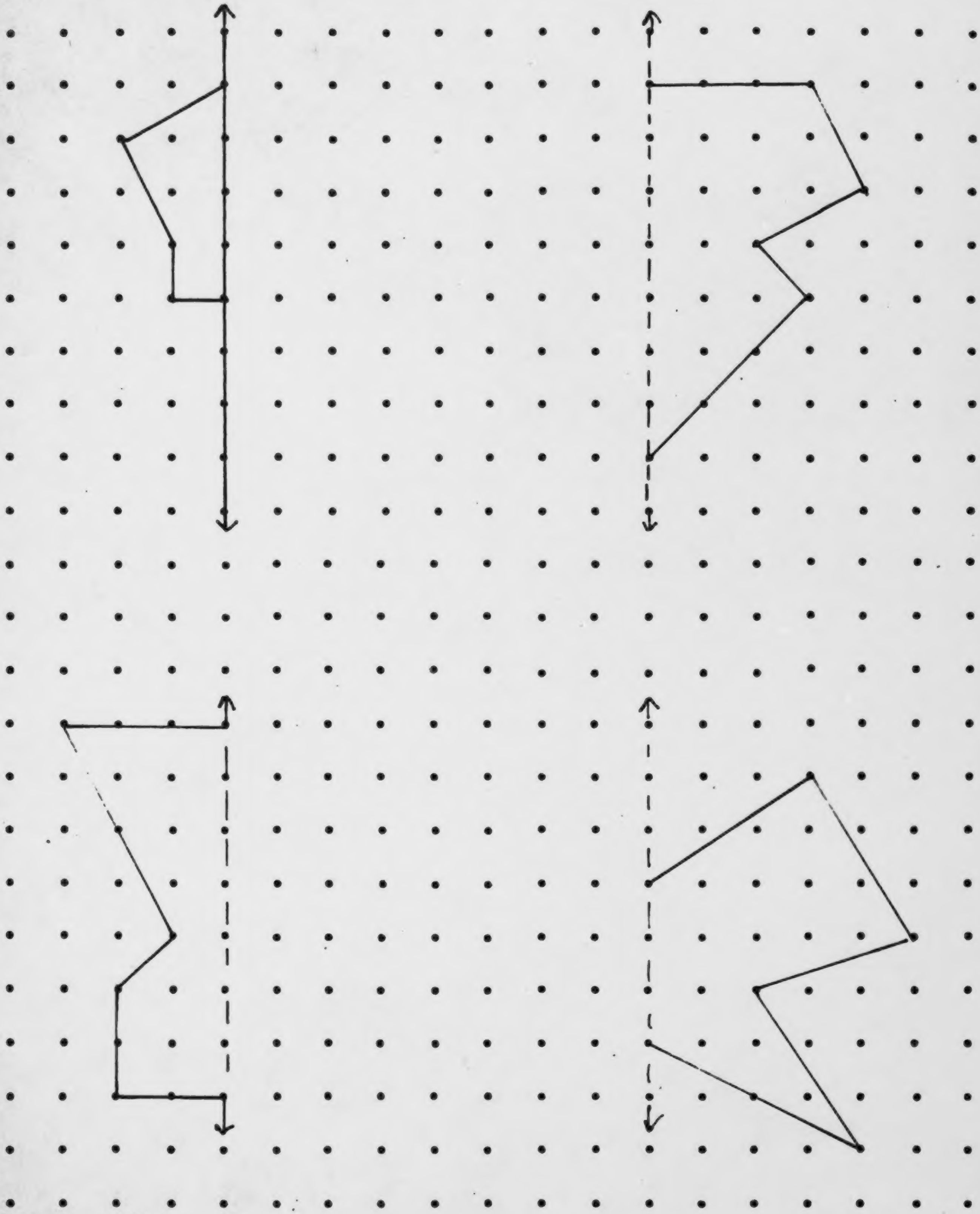
Mathematician:____

"I made the shapes with the areas given and recorded this on the geoboard picture."

SHAPES	AREA	GEOBOARD
2 different triangles	4	
5 sided	5	
6 SIDED	5	

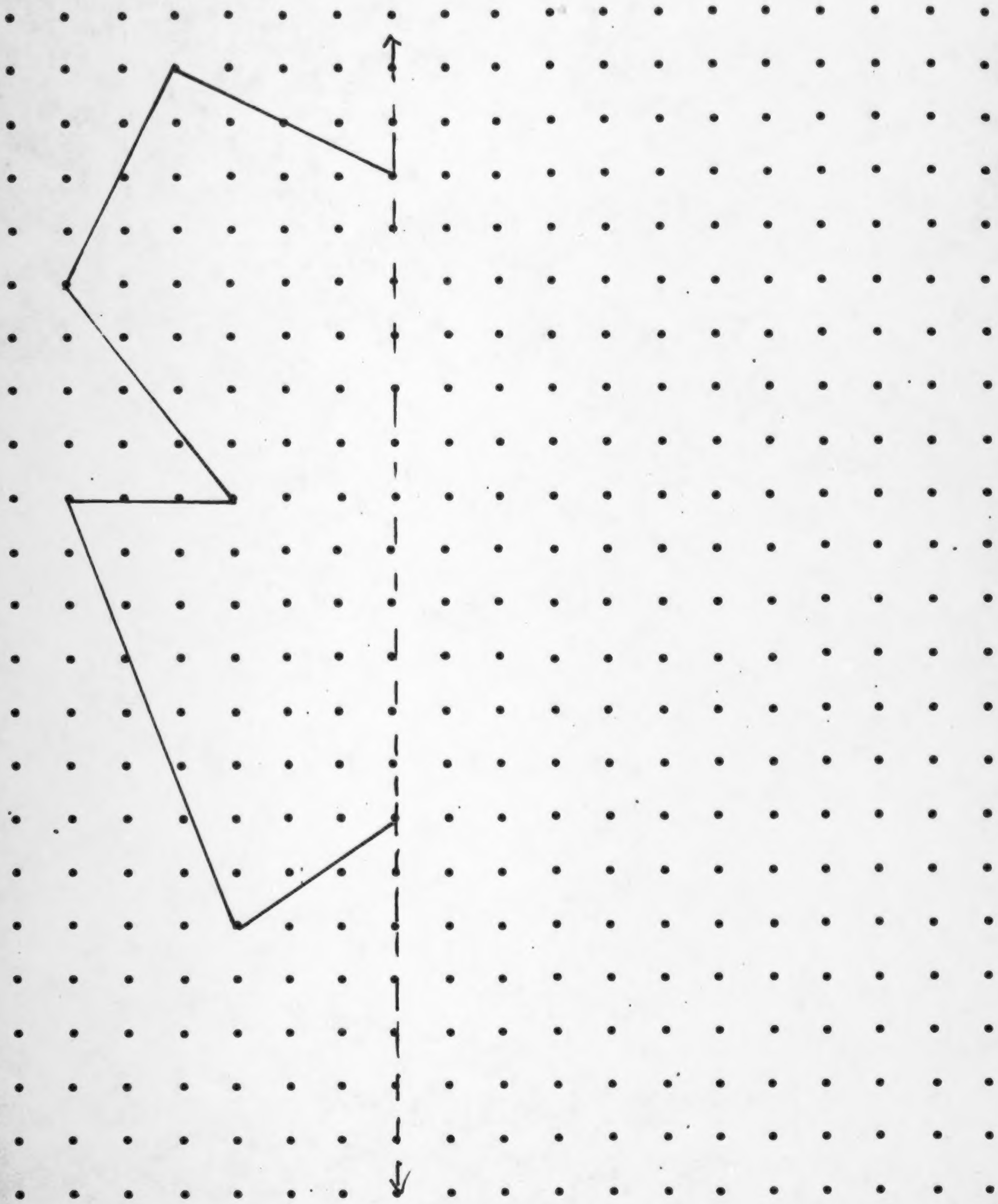
Mathematician:____

"I completed these figures so the new shape has the indicated line of symmetry."



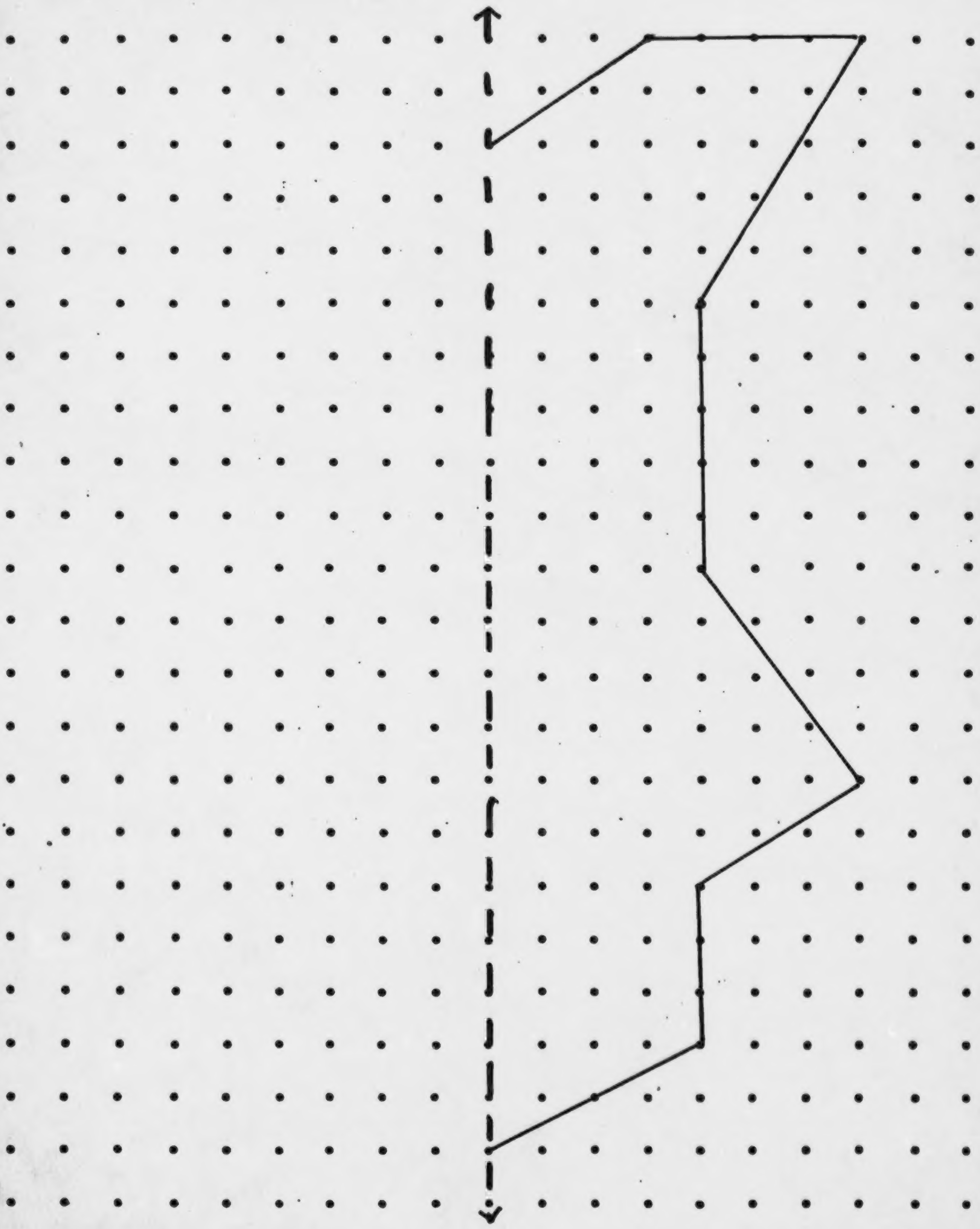
Mathematician:____

"I completed these figures so the new shape has the indicated line of symmetry."



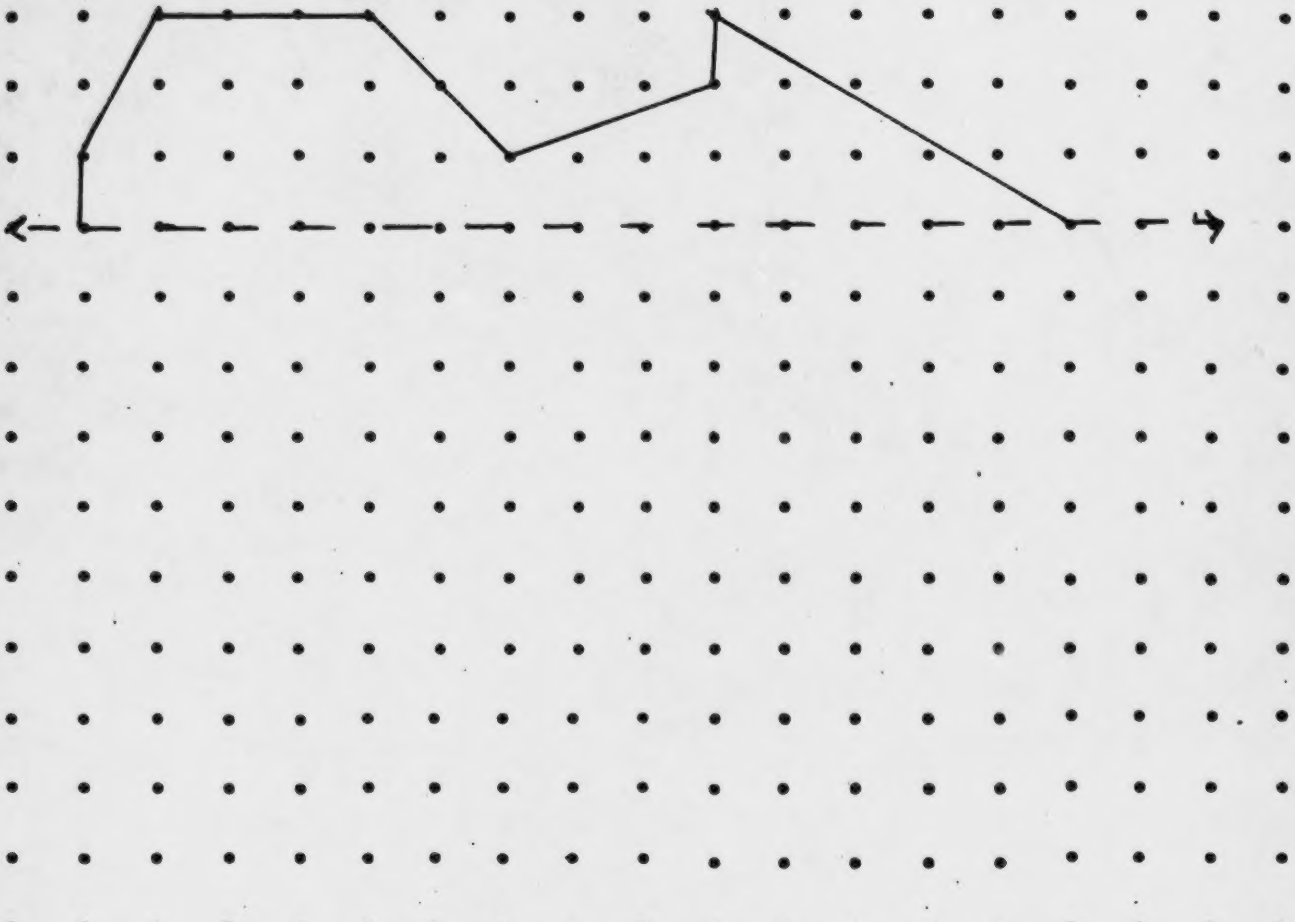
Mathematician:____

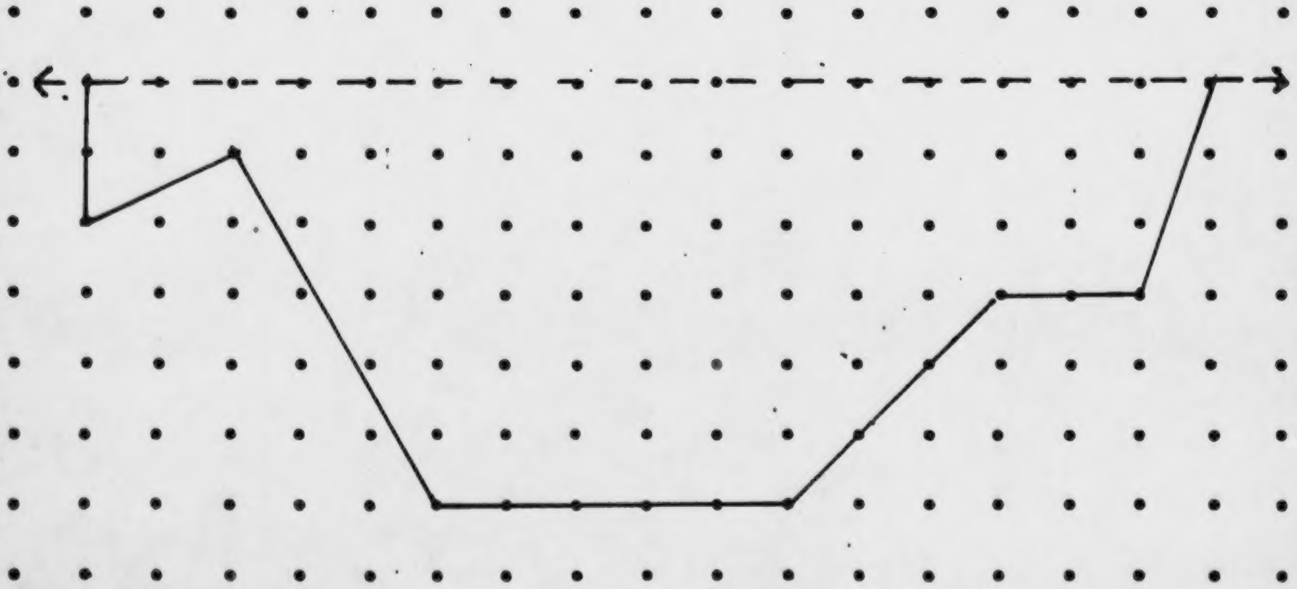
"I completed these figures so the new shape has the indicated line of symmetry."



Mathematician:____

"I completed these figures so the new shape has the indicated line of symmetry."





Mathematician:____

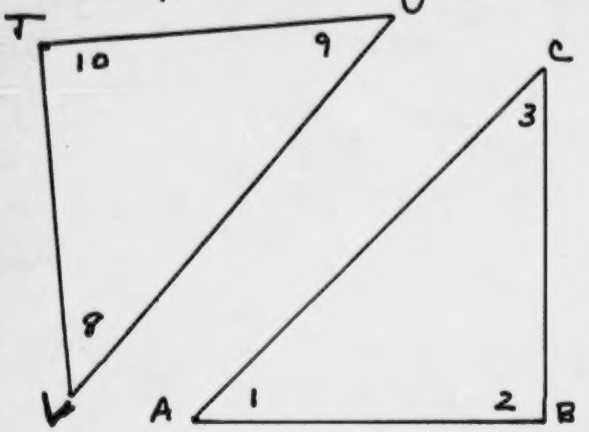
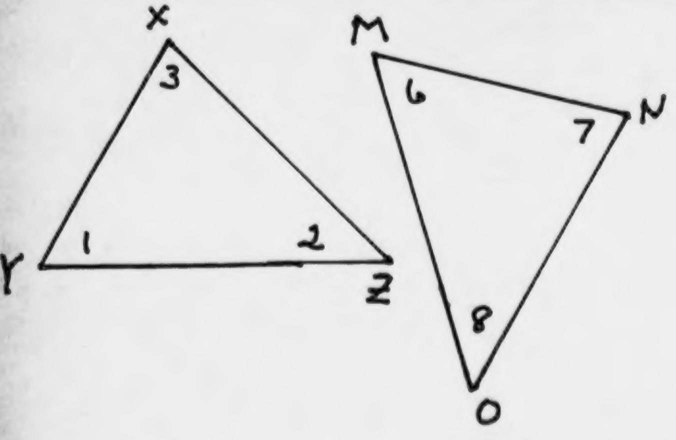
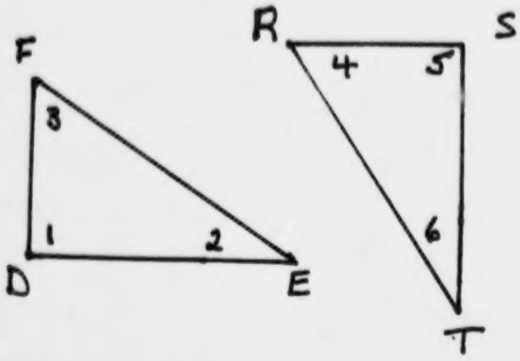
"I found all pairs of congruent triangles and all pairs of similar triangles on sheets I & II and wrote the letters of these."

CONGRUENT TRIANGLES	SIMILAR TRIANGLES

6.12.89.1

Mathematician:____

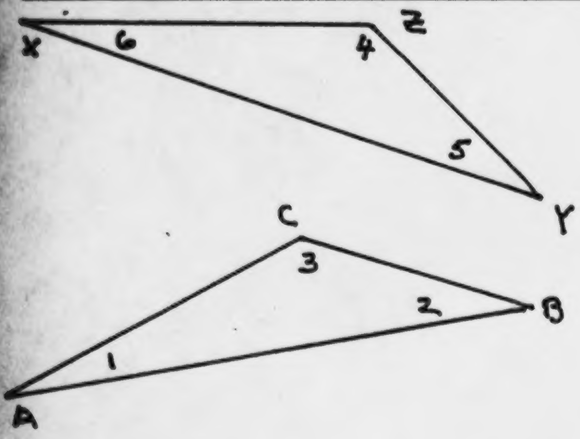
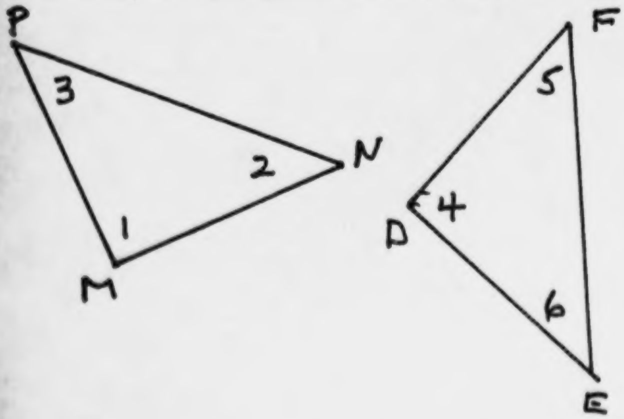
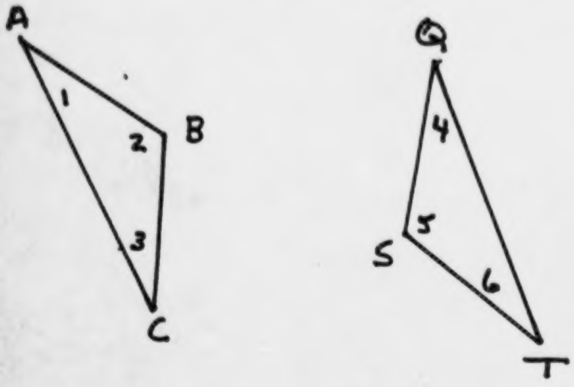
"I found the corresponding parts for the congruent triangles given and wrote them in the columns."

TRIANGLES	CORRESPONDING SIDES	CORRESPONDING ANGLES
Example  T U V 10 9 8 C 3 A B 1 2	TU and BA TV and BC AC and UV	∠1 and ∠9 ∠10 and ∠2 ∠3 and ∠8
 X 3 Y 1 2 Z M 6 N 7 8 O		
 F 8 1 2 D E R S 4 5 6 T		

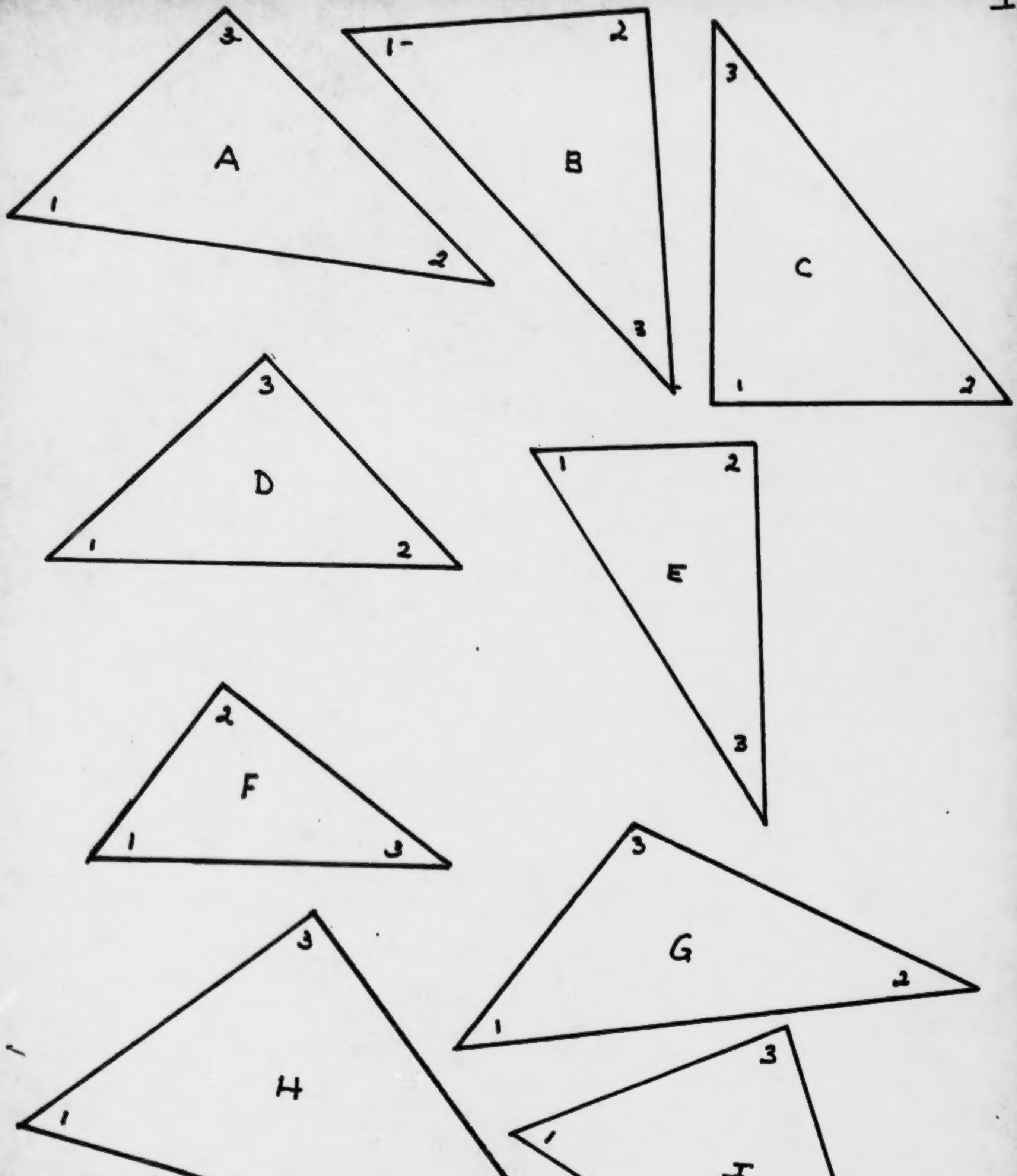
6.12.89.16

Mathematician:____

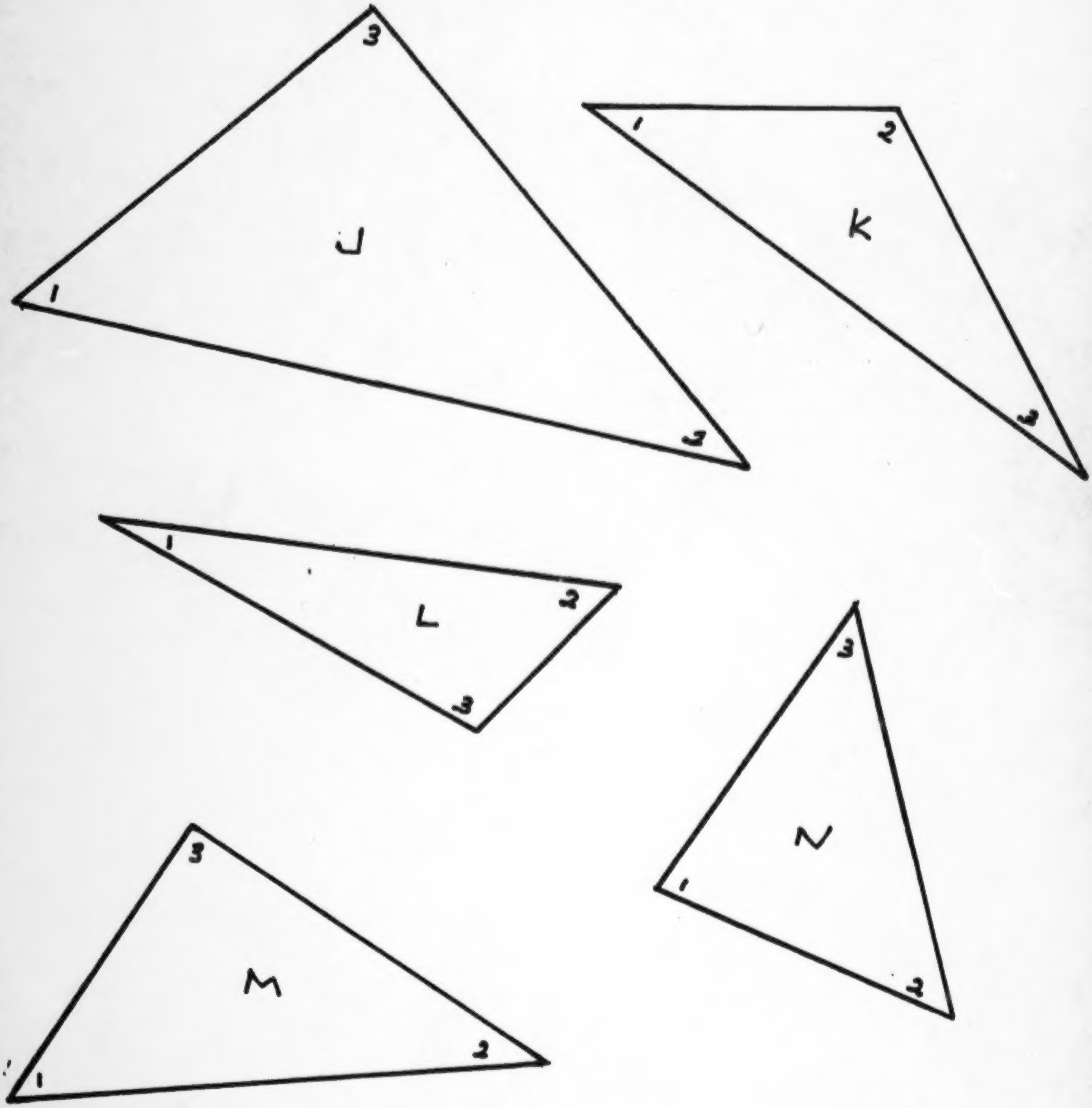
"I found the corresponding parts for the congruent triangles given and wrote them in the columns."

TRIANGLES	CORRESPONDING SIDES	CORRESPONDING ANGLES
 X 6 Z 4 5 Y C 3 2 B 1 A		
 P 3 N 2 1 M F 5 D 4 6 E		
 A 1 B 2 3 C Q 4 5 S 6 T		

I


3
A
1
2
1-
2
B
3
3
C
1
2
3
D
1
2
1
2
E
3
2
F
1
3
3
G
2
1
3
H
1
2
3
1
I
2

II


3
J
1
2
1
2
K
3
1
2
L
3
3
N
1
2
3
M
1
2

Mathematician:____

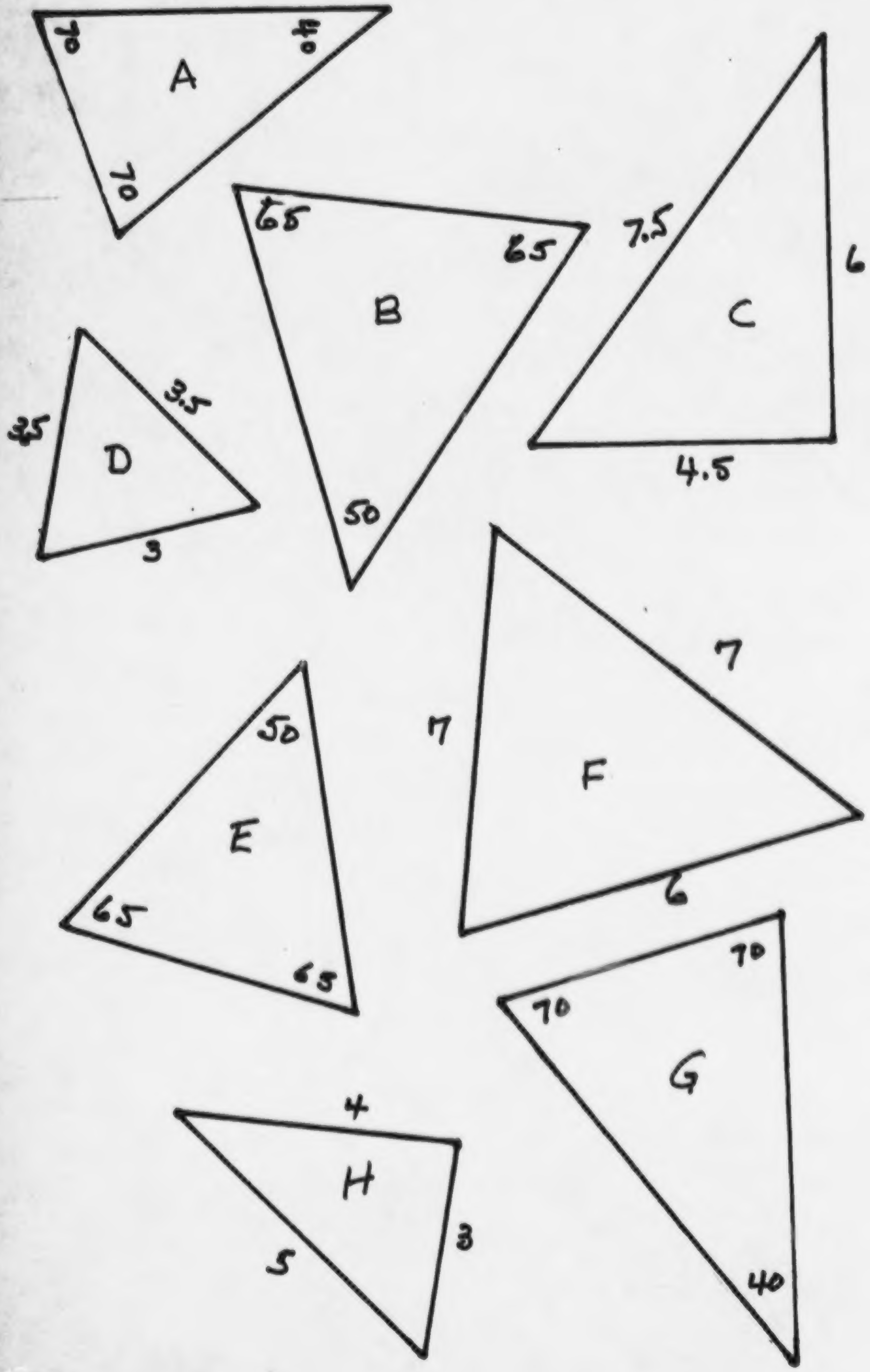
"We recorded the letters of every pair of similar triangles on sheets I & II and wrote the reason - all angles equal or sides proportional."

PAIRS OF SIMILAR TRIANGLES	REASONS

Mathematician:____

"I picked out the triangles that are similar and wrote why they are."

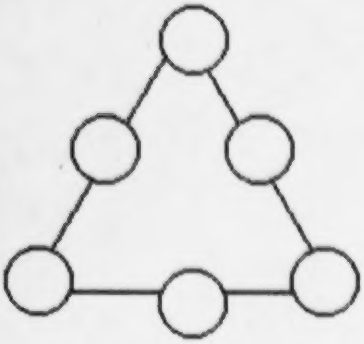
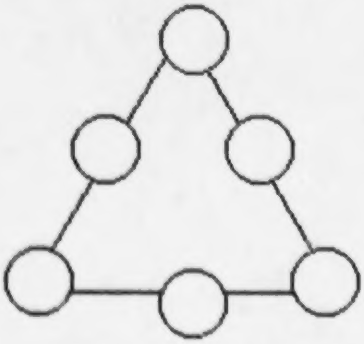
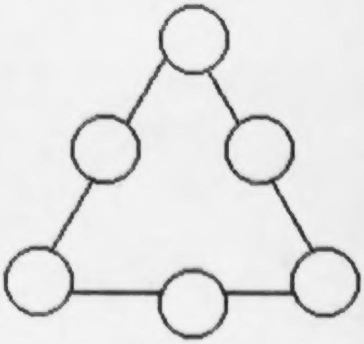
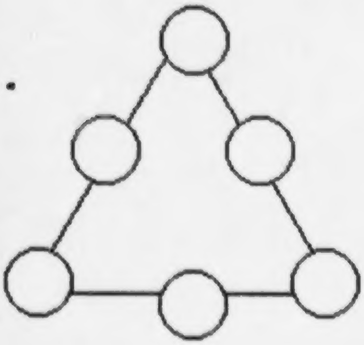
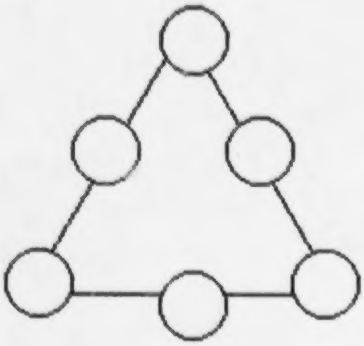
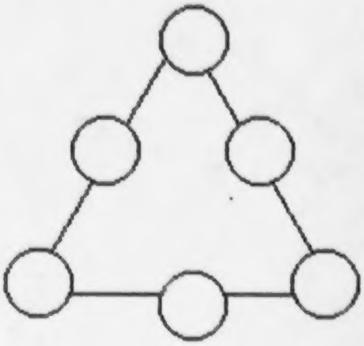
GIVEN TRIANGLES	SIMILAR TRIANGLE P


A
70
40
70
B
65
65
50
C
7.5
6
4.5
D
3.5
3.5
3
E
50
65
65
F
7
7
6
G
70
70
40
H
4
3
5

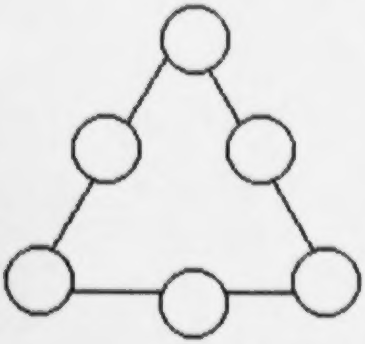
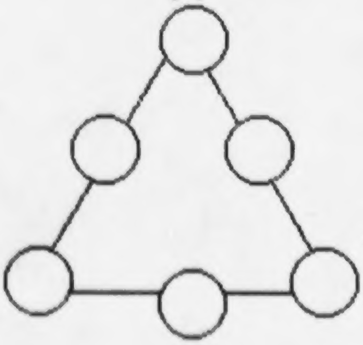
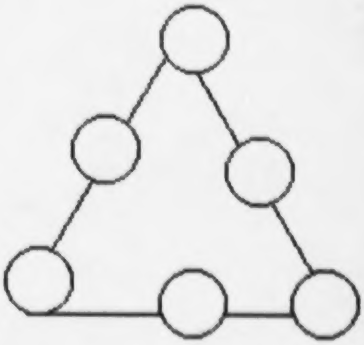
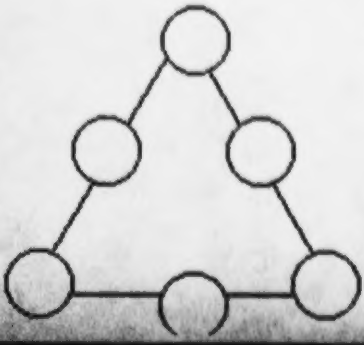
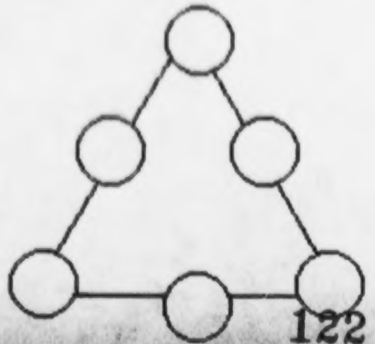
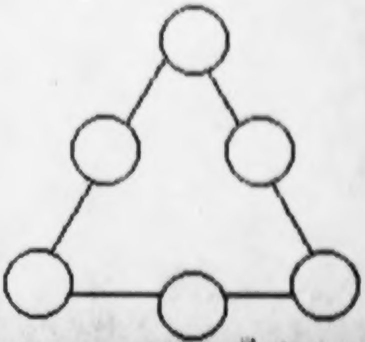
Mathematician:____

"I used the numbers 1, 2, 3, 4, 5 and 6 in the circles so the sides added to the number given."

10

11

Mathematician:______________________________________

"For each series of 9 numbers given, I found the number to go into the middle square and the sum for the rows, columns, and diagonals of the MAGIC SQUARE."

Number series $\frac{1}{4}, \frac{3}{4}, \frac{5}{4}, \frac{7}{4}, \frac{9}{4}, \frac{11}{4}, \frac{13}{4}, \frac{15}{4}, \frac{17}{4}$
"Middle" number
Row, Column, Diagonal
Sum for the Square

THE MAGIC SQUARES

Mathematician:____

"For each series of 9 numbers given, I found the number to go into the middle square and the sum for the rows, columns, and diagonals of the MAGIC SQUARE."

Number series -3, -1, 1, 3, 5, 7, 9, 11, 13
"Middle" number
Row, Column, Diagonal
Sum for the Square

THE MAGIC SQUARES

Mathematician:____________________________________

"For each series of 9 numbers given, I found the number to go into the middle square and the sum for the rows, columns, and diagonals of the MAGIC SQUARE."

Number series 0, 2, 4, 6, 8, 10, 12, 14, 16
"Middle" number
Row, Column, Diagonal
Sum for the Square

THE MAGIC SQUARES

Mathematician:____

"For each series of 9 numbers given, I found the number to go into the middle square and the sum for the rows, columns, and diagonals of the MAGIC SQUARE."

Example:

Number series 1, 3, 5, 7, 9, 11, 13, 15, 17

"Middle" number 9

Row, Column, Diagonal
Sum for the Square 27

THE MAGIC SQUARES

Mathematician:____

"I spun 100 times and recorded the results."

Predicted Color				Actual Color		
Red	Green	Yellow		Red	Green	Yellow

4-24-89.1

continued

Predicted Color				Actual Color		
Red	Green	Yellow		Red	Green	Yellow

In a family with one child, there are two possibilities - a boy or a girl. In a family of two children the possibilities are show in the table. Complete the table for a family with 4 children and a family with 5 children:

Boys	Girls	Total
1	0	1
0	1	1
2	0	2
0	2	2
1	1	2
		4
		5

DIGITS: The digits 1 and 2 make 21 and 12. Show all numbers possible using the given digits. Do not use any digit more than once.

DIGITS	NUMERALS
1,2,3	
1,2,3,4	
0,4,6	

Mathematician: ______________________________

"I chose the given number of statements, recorded the allowed number of moves and the results of the game."

CHIPS AVAILABLE

RED	
GREEN	
YELLOW	

RULE: ______________________________

____

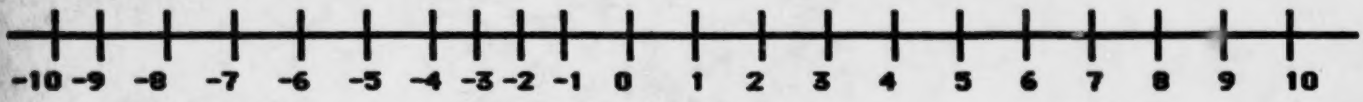
________ Moves to win

	________ Number of chips chosen			Statement(s) Chosen	Allowed to Move?	
	RED	GREEN	YELLOW		YES	NO
1st choice						
2nd choice						
3rd choice						
4th choice						
5th choice						
6th choice						
7th choice						
8th choice						
9th choice						
10th choice						

4.18.89

Mathematician:____

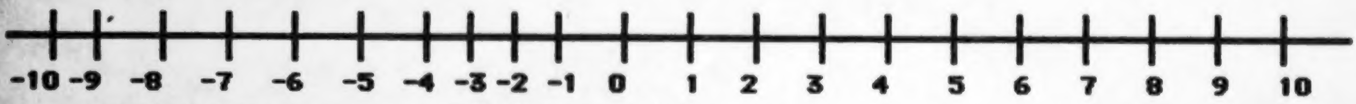
"I used the number line to add to and subtract from the given inequalities."


-10
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
9
10

INEQUALITY	TO ADD OR SUBTRACT	RESULT
$8 > 6$	$+4$	
$-3 < -1$	-2	
$0 < 4$	-6	
$2 < 7$	$+2$	
$3 < 11$	-5	
$4 > -1$	-6	
$4 > 3$	$+6$	
$-3 < 0$	-2	
$6 > 1$	-4	
$2 < 8$	$+3$	

Mathematician:____

"I used the number line to add to and subtract from the given inequalities."



INEQUALITY	TO ADD OR SUBTRACT	RESULT
EXAMPLE: $\square + 2 > 7$	-2	$\square > 5$ can you list 4 of these?
$\square + 1 < 5$		
$\square - 3 < 4$		
$2\square + 1 > 9$		
$\square + 5 < 11$		
$2\square - 1 < 7$		
$\square - 3 < 4$		
$2\square - 3 < 7$		
$2\square - 3 > 3$		
$\square + 6 < 13$		

Mathematician:____________________________

"For the following sets of data, I

1. found the mean
2. found the range
3. graphed the data given on the balance beam
4. found the MOMENTS on each side

TEST SCORES	BALANCE BEAM
20, 25, 25, 30 42, 45	Mean____________ Range ____________ Moments clockwise ____________ Moments counterclockwise ____________
15, 18, 20, 20, 20, 25, 29	Mean____________ Range ____________ Moments clockwise ____________ Moments counterclockwise ____________
85, 92, 94, 96, 99, 100	Mean____________ Range ____________ Moments clockwise ____________ Moments counterclockwise ____________

Mathematician:____

"For the following sets of data, I

1. found the mean
2. found the range
3. graphed the data given on the balance beam
4. found the MOMENTS on each side

TEST SCORES	BALANCE BEAM
39, 43, 47, 51, 55, 57, 61	Mean________________ Range ____________ Moments clockwise ______________________ Moments counterclockwise __________________
5, 6, 8, 10, 12, 15, 16, 18, 19	Mean________________ Range ____________ Moments clockwise ______________________ Moments counterclockwise __________________
9, 9, 12, 15, 16, 17, 18	Mean________________ Range ____________ Moments clockwise ______________________ Moments counterclockwise __________________

Mathematician:____

"For each data set I found the range and the average. Then I showed how the data would balance a beam with the center at the average."

DATA SET	BEAM BALANCE

Mathematician:____

"For each data set I found the range and the average. Then I showed how the data would balance a beam with the center at the average."

DATA SET	BEAM BALANCE

Problems That Involve Data Analysis

1. These tables show the births and deaths in the United States in 5 years.

	Units of Measure	1970	1975	1980	1982	1983
Births	1000	3732	3144	3612	3631	3614
Deaths	1000	1921	1893	1990	1986	2010
Difference between births & deaths	1000					
Population	millions	203.3	215.5	226.5	231.8	234

   a. Complete the table
   b. Find the part of the increase in population for each period that is due to the difference between births and deaths
   c. Graph the data in the table using a line graph.

2. This table shows the school enrollment and school expenditures for several years for public elementary and secondary schools:

	Unit of Measure	1970	1975	1980	1982	1983
Enrollment	millions	60.4	60.1	57.3	57.9	57.7
Expenditures	$billions	46.0	70.9	102.5	119.1	127.0

   a. What is the expenditure in dollars/unit of enrollment for each year? ________________
   b. Why do you think expenditures increased while enrollments decreased?

   c. Does the graph showing births have any relationships to the decline in enrollment over this period?

3. This table shows deaths from various causes for several years:

Causes of Death	1970	1980	1981
		in 1,000's	
All causes	1921	1989.8	1978
Cardiovascular diseases	1008	988.5	973
Malignancies	330.7	416.5	422.1
Accidents	114.6	105.7	100.7
Obstructive Conditions	30.9	56.1	58.8
Pneumonia & Flu	62.7	54.6	53.7
Diabetes	38.3	34.9	34.6
Other			

a. Fill in the "other" line of the table.

b. In which year was the percent of deaths that were due to accidents the highest? ____________

c. The deaths due to cardiovascular disease were how many 1000's more than all other causes? ____________

4. This table shows incidence of tooth decay in children for 2 periods.

	1971-1974		1979-1980	
Age	No. of Children (1000)	Average No. of Fillings	No. of Children (1000)	Average No. of Fillings
10	4378	4.14	3515	2.60
11	4088	4.58	3479	3.00
12	4116	6.36	3601	4.18
13	4153	8.67	3822	5.41
14	4046	9.60	4063	5.53

a. Why do you think the average number of fillings increased with age?

b. Why is the average number of fillings lower for 1979-80 than for 1971-74?

c. If the average number of fillings declines at the same rate, what should the average number of fillings be for a 12 year old in 1985-86?

Mathematician:____

"For each frequency table given, I made a horizontal bar graph, a vertical bar graph and a circle graph."

FAVORITE TELEVISION SHOWS OF STUDENTS:

Detective	60
Comedy	45
Variety	38
Western	50

FAVORITE COLORS OF STUDENTS

Blue	50
Pink	45
Red	54
Orange	49
Yellow	52

STEREO TAPE SALES

Monday	150
Tuesday	130
Wednesday	140
Thursday	115
Friday	155

CHOICES OF A FAVORITE SPORT

Tennis	40
Hockey	36
Soccer	34
Baseball	44
Football	46

Mathematician:____ 2.

FAVORITE SUBJECTS OF STUDENTS

Math	60
English	56
Spanish	44
Science	50
History	46
French	44

MATHEMATICS: TEST SCORES OF A CLASS

Score	Number Receiving
95	15
85	25
80	50
75	30
70	20
60	15

LEVEL SIX LOGO WORKSHEET

Mathematician:____

"I ran the procedures given using 10 as input. I answered the questions."

```
(INPUT) MYSTERY1  10

TO MYSTERY1  :NUMBER
IF  :NUMBER = 0 [STOP]
PRINT  :NUMBER
MYSTERY1  :NUMBER -1
END
```

What was the first number printed? ________________

What was the last number printed? ________________

```
(INPUT)  MYSTERY2  10

TO MYSTERY2  :NUMBER
IF  :NUMBER = 0 [STOP]
MYSTERY2  :NUMBER -1
PRINT  :NUMBER
END
```

What was the first number printed?______________

What was the last number printed?______________

Explain the difference in the two printed lists. All statements in the two procedures are the same; they are just ordered differently!

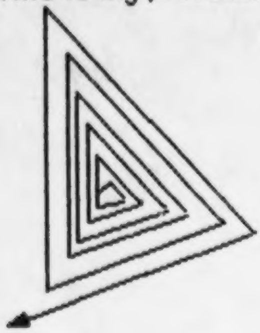
This is my procedure to print:

1
2
3
4
5
6
7
8

This is my procedure to print:

```
        1    2    3    4    5    6    7    8
```

This is my procedure to give:



LEVEL SIX LOGO WORKSHEET

Mathematician:____

"I ran the procedures given using 10 as input. I answered the questions."

```
(INPUT) MYSTERY1  10

TO MYSTERY1  :NUMBER
IF  :NUMBER = 0 [STOP]
PRINT  :NUMBER
MYSTERY1  :NUMBER -1
END
```

What was the first number printed? __________________

What was the last number printed? __________________

```
(INPUT)  MYSTERY2  10

TO MYSTERY2  :NUMBER
IF  :NUMBER = 0 [STOP]
MYSTERY2  :NUMBER -1
PRINT  :NUMBER
END
```

What was the first number printed?________________

What was the last number printed?________________

Explain the difference in the two printed lists. All statements in the two procedures are the same; they are just ordered differently!

This is my procedure to print:

1
2
3
4
5
6
7
8

This is my procedure to print:

1 2 3 4 5 6 7 8